Aficio Color 3006/4006/4106 (Iris/Lilac, A258/A259/A260) Service Manual

Issued February 24, 1999, Ricoh CO., LTD.

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main power switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. If the Start key is pressed before the copier completes the warm-up period (the Start key starts blinking red and green alternatively), keep hands away from the mechanical and the electrical components as the copier starts making copies as soon as the warm-up period is completed.
6. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filters installed.
2. Always replace the ozone filters with the specified ones at the specified intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.
2. The NVRAM on the system control board has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.

1. **SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL**
   Do not incinerate toner bottles or used toner. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of used toner, developer, and organic photoconductors in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used lithium batteries in order to dispose of them later, do not put more than 100 batteries per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

LASER SAFETY

The Center for Devices and Radiological Health (CDRH) prohibits the repair of laser-based optical units in the field. The optical housing unit can only be repaired in a factory or at a location with the requisite equipment. The laser subsystem is replaceable in the field by a qualified Customer Engineer. The laser chassis is not repairable in the field. Customer engineers are therefore directed to return all chassis and laser subsystems to the factory or service depot when replacement of the optical subsystem is required.

⚠WARNING

Use of controls, or adjustment, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

⚠WARNING

Turn off the main switch before attempting any of the procedures in the Laser Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:

TABLE OF CONTENTS

1. OVERALL MACHINE INFORMATION 1-1
1.1 SPECIFICATIONS 1-1
1.1.1 MACHINE CONFIGURATION 1-1
1.1.2 GENERAL SPECIFICATIONS 1-2
1.1.3 PLATEN/ARDF ORIGINAL SIZE DETECTION 1-6
1.1.4 COPY PAPER SIZE 1-7
1.1.5 APS PAPER SIZES AVAILABLE 1-8
1.1.6 NOISE EMISSION 1-9
1.1.7 POWER CONSUMPTION 1-10
1.1.8 DISPLAY EDITOR SPECIFICATIONS 1-10
1.2 MECHANISM OVERVIEW 1-11
1.2.1 IMAGE GENERATION PROCESS 1-11
1.3 MAJOR UNIT LAYOUT AND PAPER FEED PATH 1-14
1.4 PARTS LAYOUT 1-17
1.4.1 MECHANICAL COMPONENT LAYOUT 1-17
1.4.2 ELECTRICAL COMPONENT LAYOUT 1-18
1.4.3 DRIVE LAYOUT 1-25
1.4.5 AIR FLOW 1-26
1.4.5 ELECTRICAL COMPONENT DESCRIPTIONS 1-27
Printed Circuit Boards 1-27
Motors 1-28
Fan Motors 1-28
Sensors 1-29
Switches 1-30
Clutches 1-30
Solenoids 1-31
Lamps 1-31
Heaters 1-31
Thermistors 1-31
Thermofuses 1-31
Thermostat 1-31
Counter 1-32

2. DETAILED DESCRIPTIONS 2-1
2.1 PROCESS CONTROL 2-1
2.1.1 OVERVIEW 2-1
2.1.2 POTENTIAL CONTROL 2-2
Overview 2-2
Potential Control Timing 2-2
2.1.3 PROCESS CONTROL SELF CHECK 2-4
Flow Chart 2-4
Step 1: VSG Adjustment 2-5
Step 2: ID Sensor Pattern Generation 2-5

Step 3: Sensor Pattern Potential Detection 2-6
Step 4: Sensor Pattern Density Detection 2-7
Step 5: Toner Amount Calculation 2-8
Step 6: Development Potential Calculation 2-9
Step 7: Selecting the Optimum VD, VB, VL 2-10
2.1.4 PROCESS CONTROL γ CORRECTION 2-11
What is process control γ? 2-11
How is it done? 2-11
Process control gamma correction timing 2-12
2.2 TONER SUPPLY CONTROL 2-13
2.2.1 TONER SUPPLY CONTROL METHOD 2-13
2.2.2 FUZZY CONTROL MODE 2-13
2.2.3 VSP DETECTION FOR TONER SUPPLY CONTROL 2-14
2.2.4 CALCULATING THE AMOUNT OF TONER ON THE DRUM 2-14
Fuzzy Logic Algorithm 2-14
Image Area Ratio 2-15
2.2.5 FIXED SUPPLY MODE 2-15
2.2.6 TONER SUPPLY IN ABNORMAL SENSOR CONDITIONS 2-15
2.2.7 DETECTING TONER NEAR END/END 2-16
Toner Near-end 2-16
Toner End 2-16
Toner near end detection 2-17
Toner end detection 2-17
Toner end recovery 2-18
Toner replenishment confirmation mode 2-18
2.3 DRUM UNIT 2-19
2.3.1 OVERVIEW 2-19
2.3.2 DRIVE MECHANISM 2-20
2.3.3 DRUM CHARGE 2-21
2.3.4 DRUM CLEANING 2-22
2.3.5 PCC 2-22
2.3.6 QUENCHING 2-23
2.3.7 CARRIER CATCHER 2-23
2.4 SCANNER UNIT 2-24
2.4.1 OVERVIEW 2-24
2.4.2 SCANNER 2-25
2.4.3 SCANNER DRIVE 2-26
2.4.4 COLOR CCD 2-27
2.4.5 WHITE PLATE SCANNING 2-28
2.4.6 SCANNER IPU BOARD 2-28
2.4.7 ORIGINAL SIZE DETECTION 2-29
2.4.8 OTHERS 2-31
Anti-condensation Heater 2-31
Fans 2-31
2.5 IMAGE PROCESSING 2-32
2.5.1 OVERVIEW 2-32
2.5.2 SCANNER SECTION BLOCK DIAGRAM 2-33
2.5.3 SCANNER SECTION 2-34
Photoelectric Conversion (by the CCD) 2-34

Signal Processing (in the Analog ASIC) 2-34
A/D Conversion 2-34
Shading Circuit 2-35
D/A Conversion 2-37
Scan Line Correction 2-37
2.5.4 IPU SECTION BLOCK DIAGRAM 2-38
2.5.5 IPU SECTION 2-39
Picture Element Correction and Scanner Gamma Correction 2-39
ACS (Auto Color Selection) 2-41
Auto Letter/Photo Separation 2-42
Filtering and Color Conversion 2-44
Changes in UCR Ratio with Image Density and Copy Mode 2-50
UCA (Under Color Addition) 2-50
Main Scan Magnification 2-51
Mirror Image 2-51
Gamma (γ) Correction (Printer Gamma) 2-52
Area Editing 2-55
CPU 2-55
IPU Board Test 2-55
2.6 LASER EXPOSURE 2-56
2.6.1 OVERVIEW 2-56
2.6.2 OPTICAL PATH 2-57
Overview 2-57
F-theta Lenses and the BTL 2-59
Laser Synchronizing Detector Boards 2-60
Gradation Control (Laser Pulse Width and Laser Power Modulation) 2-61
600 DPI Writing 2-62
Auto Power Control (APC) 2-63
LD Safety Switches 2-64
2.6 DEVELOPMENT UNIT 2-65
2.6.1 OVERVIEW 2-65
2.6.2 REVOLVER MECHANISM 2-66
Overview 2-66
Revolver Drive 2-67
Revolver Home Position Detection 2-68
2.6.3 DEVELOPMENT MECHANISMS 2-69
Overview 2-69
Development Drive 2-70
Developer Agitation 2-70
Toner Agitation 2-71
Development Bias 2-72
Toner Supply Mechanism 2-73
Toner Cartridge Detection 2-74
Incorrect Toner Installation Prevention 2-74
Toner End Detection 2-75
2.7 TRANSFER BELT UNIT 2-76
2.7.1 OVERVIEW 2-76
2.7.2 BELT TRANSFER MECHANISMS 2-77
Transfer Belt Drive 2-77

Transfer Belt Release Lever 2-78
Belt Transfer Bias 2-79
Belt Mark Detection 2-80
Transfer Belt Cleaning Mechanism 2-81
2.7.3 PAPER TRANSFER MECHANISM 2-85
Paper Transfer Unit Contact/Release Mechanism 2-85
Paper Transfer Bias Roller Drive 2-86
Paper Transfer Bias Roller Cleaning 2-87
Paper Transfer Bias 2-88
2.7.4 PAPER SEPARATION MECHANISM 2-90
2.8 PAPER FEED AND REGISTRATION 2-91
2.8.1 OVERVIEW 2-91
2.8.2 PAPER TRAY 2-92
Paper Feed/Separation 2-92
Separation and Pick-Up Roller Release 2-92
Paper Lift 2-93
Paper End Detection 2-94
Paper Size Setting 2-94
Tray Paper Height Sensor 2-95
2.8.3 BY-PASS TRAY 2-96
By-pass Table Mechanism 2-96
Paper Feed/Separation 2-96
Paper End Detection 2-97
Paper Size Detection 2-98
Pick-up Roller 2-99
2.8.4 REGISTRATION MECHANISM AND PAPER FEED DRIVE 2-99
2.9 PAPER TRANSPORT, FUSING, AND PAPER EXIT 2-100
2.9.1 MAJOR COMPONENTS 2-100
2.9.2 DRIVE MECHANISM 2-101
2.9.3 FUSING UNIT 2-102
Fusing Mechanism 2-102
Fusing Temperature Control 2-102
Fusing/Pressurization Mechanism 2-103
Oil Supply Mechanism 2-104
Cleaning Mechanism 2-105
2.9.4 INVERTER AND PAPER EXIT MECHANISMS 2-106
Paper Exit 2-106
Junction Gate Mechanism (A259/A260 Only) 2-106
Paper Exit Door Mechanism (A259/A260 Only) 2-107
2.10 DUPLEX TRAY (A259/A260 COPIERS ONLY) 2-108
2.10.1 OVERVIEW 2-108
2.10.2 DRIVE MECHANISM 2-109
2.10.3 PAPER FEED INTO THE DUPLEX TRAY 2-110
1. Duplex Stacking 2-110
2. Paper Feed from the Duplex Tray 2-110
3. Duplex Entrance To Duplex Tray 2-111
2.10.4 JOGGER MECHANISM 2-112
2.10.5 PAPER FEED FROM THE DUPLEX TRAY 2-113
Bottom Plate Lift Mechanism 2-113

Paper Feed-out mechanism 2-114
2.11 OTHERS 2-115
2.11.1 SYSTEM CONFIGURATION 2-115
2.11.2 POWER STATES 2-116
Energy Saver Mode 2-116
Power-off (Sleep) State 2-116
Main Power Switch Off State 2-117
Power State Transition Diagram 2-117
2.11.3 TOUCH PANEL (A259/A260 MACHINES ONLY) 2-118
2.11.4 BUS SWITCH BOARD (OPTIONAL) 2-119

3. INSTALLATION PROCEDURE 3-1
3.1 INSTALLATION REQUIREMENTS 3-1
3.1.1 DIMENSIONS 3-2
3.1.2 ENVIRONMENTAL REQUIREMENTS 3-3
3.1.3 MINIMUM SPACE REQUIREMENTS 3-5
3.1.4 POWER REQUIREMENTS 3-6
3.2 COPIER INSTALLATION 3-7
3.2.1 ACCESSORY CHECK 3-7
3.2.2 COPIER INSTALLATION PROCEDURE 3-8
Tape Removal 3-8
Removing the Inner Transfer Cover and Paper Transfer Locking Screw 3-10
Developer Installation 3-12
Pressure Release Lever Set-up 3-17
Installing Fusing Silicone Oil 3-18
Initialization and Function Checks 3-19
Setting the Tray Paper Size 3-20
Setting the Language and Unit of Measurement 3-21
Resetting the Counter 3-21
3.2.2 RELOCATION PROCEDURE 3-22
3.3 PAPER TRAY UNIT (A832/A833) 3-23
3.3.1 ACCESORY CHECK 3-23
3.3.2 INSTALLATION 3-24
TRAY HEATER (OPTION) 3-27
3.4 PLATEN COVER (A749-01) 3-28
3.5 ARDF (A663) 3-29
3.5.1 ACCESSORY CHECK 3-29
3.5.2 INSTALLATION 3-30
3.6 20-BIN SORTER STAPLER (A834) 3-31
3.6.1 ACCESSORY CHECK 3-31
3.6.2 INSTALLATION 3-32
3.7 10-BIN SORTER STAPLER (A555) 3-36
3.7.1 ACCESSORY CHECK 3-36
3.7.2 INSTALLATION 3-37
3.8 3-BIN SORTER (A849) 3-42

3.8.1 ACCESSORY CHECK 3-42
3.8.2 INSTALLATION 3-43
3.9 FILM PROJECTOR TABLE (A702-19) 3-45
3.10 FILM PROJECTOR UNIT (A846) 3-47
3.10.1 ACCESSORY CHECK 3-47
3.10.2 INSTALLATION 3-48
3.11 CONTROLLER INTERFACE TYPE E (A848) 3-55
3.12 OTHERS 3-59
3.12.1 ORIGINAL TABLE INSTALLATION PROCEDURE 3-59
3.12.2 KEY COUNTER HOLDER INSTALLATION PROCEDURE 3-60

4. SERVICE TABLES 4-1
4.1 SERVICE PROGRAM (SP) MODES 4-1
4.1.1 HOW TO ENTER SP MODE 4-1
4.2 SP MODE TYPES 4-1
4.3 SP MODE TABLE 4-2
4.4 SP MODE ADDITIONAL NOTES 4-3
4.4.1 SP5-804 OUTPUT CHECK 4-3
4.4.2 SP5-803 INPUT CHECK 4-5
Printer 4-5
Sorter 4-7
ARDF 4-8
4.4.3 SP5-955-018 TEST PATTERN SELECTION 4-8
4.4.4 5-955-001 LD_PWM (DOT, LINE) 4-8
4.4.5 5-955-002 TO 5-955-016 LD_PWM (16-GRADATION) 4-9
4.4.6 5-995-017 LD_PWM (COLOR PATCHES) 4-9
4.5 USER TOOL 4-10
4.5.1 USER TOOL MENU 4-10
System settings 4-10
COPY FEATURES 4-11
4.5.2 SYSTEM SETTINGS 4-12
4.5.3 COPY FEATURES 4-16
General Features 4-16
Image Adjustment 4-19
Set Favorite Keys 4-21
Special Modes 4-21
4.6 TP/SW/LED/FUSE 4-22
4.6.1 MAIN CONTROL BOARD TEST POINTS 4-22
4.6.2 SCANNER IPU BOARD TEST POINTS 4-23
4.6.3 LD MAIN CONTROL BOARD TEST POINTS 4-24
4.6.4 I/O CONTROL BOARD TEST POINTS 4-25
4.6.5 SWITCH SPECIFICATIONS 4-28
Scanner IPU Board 4-28
4.6.6 LED SPECIFICATIONS 4-28
4.6.7 FUSE SPECIFICATIONS 4-29
PSU (US model) 4-29
PSU (European/Asian Model) 4-30

5. PREVENTIVE MAINTENANCE 5-1
5.1 PM PROCEDURES 5-1
5.1.1 PM-RELATED COUNTERS 5-1
5.1.2 REGULAR PREVENTIVE MAINTENANCE FLOW DIAGRAM 5-3
5.2 REGULAR PM ITEMS 5-7
Regular PM Table 5-7

6. REPLACEMENT AND ADJUSTMENT 6-1
6.1 COVERS, FANS, AND FILTERS 6-1
6.1.1 FRONT, INNER, AND INNER TRANSFER COVERS 6-1
6.1.2 REAR COVERS 6-2
6.1.3 RIGHT COVERS 6-3
6.1.4 LEFT COVERS 6-3
6.1.5 EXPOSURE GLASS 6-4
6.1.6 OPERATION PANEL 6-4
6.1.7 UPPER COVERS 6-4
6.1.8 USED TONER TANK 6-5
6.1.9 CHARGE CORONA FAN FILTER 6-5
6.1.10 MAIN EXHAUST FAN FILTER 6-6
6.1.11 SCANNER EXHAUST FAN FILTER 6-6
6.1.12 MAIN EXHAUST FAN 6-7
6.2 DRUM UNIT 6-8
6.2.1 PULLING OUT THE REVOLVER/DRUM DRAWER 6-10
6.2.2 DRUM REPLACEMENT 6-12
6.2.3 CLEANING BLADE AND PCC WIRE REPLACEMENT 6-14
6.2.4 CLEANING BRUSH REPLACEMENT 6-15
6.2.5 LUBRICANT BAR REPLACEMENT 6-16
6.2.6 CHARGE CORONA GRID AND WIRE REPLACEMENT 6-17
6.2.7 POTENTIAL SENSOR REPLACEMENT 6-18
6.3 SCANNER UNIT 6-19
6.3.1 EXPOSURE LAMP REPLACEMENT 6-19
6.3.2 SBU REPLACEMENT 6-20
6.3.3 SCANNER IPU BOARD REPLACEMENT 6-21
6.3.4 SCANNER WIRE/SCANNER MOTOR REPLACEMENT 6-22
6.3.5 APS SENSORS 6-26
6.3.6 SCANNER HP SENSOR 6-27
6.4 COPY IMAGE ADJUSTMENT 6-28
6.4.1 PRINTER GAMMA ADJUSTMENT 6-28
Setting the KCMY standard values 6-28
Gamma Data Print Out 6-28
KCMY color balance adjustment 6-28
Adjustment procedure 6-29
Standard Copy Quality 6-30
6.4.2 ACC TARGET ADJUSTMENT 6-31
6.4.3 MAIN SCAN DOT POSITION CORRECTION 6-32

6.5 LASER OPTICS SECTION 6-34
6.5.1 POLYGON MIRROR MOTOR REPLACEMENT 6-35
6.5.2 LASER SYNCHRONIZING DETECTOR BOARD AND LD UNIT REPLACEMENT 6-37
6.5.3 SQUARENESS ADJUSTMENT 6-38
6.6 DEVELOPMENT UNIT 6-40
6.6.1 REPLACING THE DEVELOPER 6-40
Developer Collection Procedure 6-40
Installing New Developer 6-43
6.6.2 POST DEVELOPER COLLECTION PROCEDURE 6-46
6.6.3 DEVELOPMENT UNIT REPLACEMENT 6-47
6.6.4 TONER COLLECTION TRAY CLEANING 6-48
6.7 TRANSFER BELT UNIT 6-49
6.7.1 TRANSFER BELT SECTION 6-49
Transfer Belt and Cleaning Unit 6-49
Cleaning Blade Replacement 6-52
Lubricant Bar and Lubricant Brush Replacement 6-53
6.7.2 PAPER TRANSFER UNIT 6-54
Lubricant Bar And Blade Replacement 6-54
Paper Separation Corona Wire Replacement 6-54
Transfer Roller Replacement 6-55
6.8 PAPER FEED AND REGISTRATION SECTION 6-56
6.8.1 BY-PASS FEED TABLE REMOVAL 6-56
6.8.2 BY-PASS PAPER WIDTH DETECTION BOARD REPLACEMENT 6-56
6.8.3 BY-PASS FEED, PICK-UP AND SEPARATION ROLLERS, AND TORQUE LIMITER REPLACEMENT 6-57
6.8.4 BY-PASS FEED UNIT REPLACEMENT 6-58
6.8.5 REGISTRATION SENSOR REPLACEMENT 6-58
6.8.6 VERTICAL TRANSPORT DOOR REPLACEMENT 6-59
6.8.7 PAPER TRAY PICK-UP, PAPER FEED, AND SEPARATION ROLLER REPLACEMENT 6-59
6.8.8 PAPER FEED UNIT AND CLUTCH REPLACEMENT 6-60
6.8.9 COPY IMAGE AREA ADJUSTMENT 6-61
Preparation 6-61
Leading Edge Registration 6-62
Side-to-side Registration 6-63
6.9 PAPER TRANSPORT, FUSING, AND PAPER EXIT SECTIONS 6-64
6.9.1 FUSING UNIT REMOVAL 6-64
6.9.2 TRANSPORT UNIT REMOVAL 6-65
6.9.3 FUSING UNIT TOP COVER REMOVAL 6-66
6.9.4 OIL SUPPLY PAD AND OIL BLADE REPLACEMENT 6-67
6.9.5 HOT ROLLER THERMOFUSE REPLACEMENT 6-68
6.9.6 FUSING UNIT DISASSEMBLY 6-68
6.9.7 CLEANING ROLLER SCRAPER CLEANING 6-69
6.9.8 HOT ROLLER THERMISTOR REPLACEMENT 6-70
6.9.9 HOT ROLLER FUSING LAMP REPLACEMENT 6-71
6.9.10 HOT ROLLER AND CLEANING ROLLER REPLACEMENT AND CLEANING 6-72

6.9.11 PRESSURE ROLLER AND PRESSURE ROLLER FUSING LAMP 6-73
6.9.12 PRESSURE ROLLER THERMOFUSE AND THERMISTOR REPLACEMENT 6-74
6.9.13 NIP BAND WIDTH ADJUSTMENT 6-75
6.9.14 CAUTIONS TO BE TAKEN WHEN USING A FUSING UNIT THAT HAS BEEN IN STOCK FOR A LONG PERIOD 6-76
6.10 DUPLEX UNIT 6-77
6.10.1 DUPLEX UNIT REMOVAL 6-77
6.10.2 SEPARATION ROLLER REPLACEMENT 6-77
6.10.3 FEED ROLLER REPLACEMENT 6-78
6.10.4 DUPLEX FEED MOTOR REPLACEMENT 6-79
6.11 SYSTEM AND ELECTRONICS 6-81
6.11.1 IPU PROGRAM DOWNLOADING 6-81
6.11.2 MAIN PROGRAM DOWNLOADING 6-82
6.11.3 NV-RAM UPLOADING AND DOWNLOADING 6-83
Upload/Download Procedure 6-83
6.11.4 RAM CLEAR 6-84
RAM Clear Procedure 6-84
Precautions when replacing the NV-RAM 6-85
6.11.5 TOUCH PANEL CALIBRATION (A259/A260 ONLY) 6-86

7. TROUBLESHOOTING 7-1
7.1 SERVICE CALL (SC) ERRORS 7-1
7.1.1 SC TYPES AND RESETTING PROCEDURES 7-1
7.2 SC CODE TABLE 7-2
7.3 PROCESS CONTROL ERROR CONDITIONS 7-3
7.3.1 PROCESS CONTROL SELF-CHECK RESULTS (SP3-975-00) 7-3
7.3.2 DEVELOPER SETUP RESULTS (SP3-964-00) 7-4
7.3.3 SELF-CHECK PROCESS CONTROL RELATED SCS 7-5
7.4 DRUM LIGHT FATIGUE 7-6

OPTIONS

ARDF (A663)

1. SPECIFICATIONS A663-1

2. COMPONENT LAYOUT A663-2
2.1 MECHANICAL COMPONENTS A663-2
2.2 ELECTRICAL COMPONENTS A663-3

3. ELECTRICAL COMPONENT DESCRIPTION A663-4

4. DETAILED DESCRIPTIONS A663-5
4.1 ORIGINAL PICK-UP MECHANISM A663-5
4.2 SEPARATION AND PAPER FEED MECHANISM A663-6
4.3 FRICTION BELT DRIVE MECHANISM A663-7
4.4 ORIGINAL SIZE DETECTION A663-8
4.5 PAPER TRANSPORT MECHANISM A663-9
4.6 THICK/THIN ORIGINAL MODES A663-10
4.7 ORIGINAL FEED-OUT MECHANISM A663-11
4.8 TWO-SIDED ORIGINAL FEED MECHANISM A663-12

5. TIMING CHARTS A663-13
5.1 A4 SIDEWAYS: 1 SIDED ORIGINAL A663-13
5.2 COMBINE 2 ORIGINAL MODE A663-14
5.3 A4 SIDEWAYS: DUPLEX A663-15

6. SERVICE TABLES A663-16
6.1 DIP SWITCHES A663-16
6.2 VARIABLE RESISTORS A663-17
6.3 LED A663-17
6.4 FUSE A663-17

7. REPLACEMENT AND ADJUSTMENT A663-18
7.1 TRANSPORT BELT REPLACEMENT A663-18
7.2 FEED ROLLER REPLACEMENT A663-19
7.3 FRICTION BELT REPLACEMENT A663-20
7.4 ORIGINAL SET AND WIDTH SENSOR REPLACEMENT A663-21
7.5 VERTICAL REGISTRATION ADJUSTMENT A663-22
7.5.1 ONE SIDED THIN ORIGINAL MODE A663-22
7.5.2 TWO SIDED ORIGINAL MODE A663-23
7.6 SIDE-TO-SIDE REGISTRATION (DF POSITIONING) ADJUSTMENT A663-24

PAPER TRAY UNIT (A832/A833)

1. PRODUCT OVERVIEW A833-1
1.1 SPECIFICATIONS A833-1
1.2 COMPONENT DESCRIPTION A833-1
1.2.1 PAPER FEED MECHANISM A833-1
1.3 COMPONENT LAYOUTS A833-2
1.3.1 ELECTRICAL COMPONENT LAYOUT A833-2
1.3.2 DRIVE LAYOUT A833-3
1.3.3 DISASSEMBLY AND ADJUSTMENT PROCEDURES A833-4
(1) Pick-up, paper feed, and separation rollers A833-4
(2) Bank paper feed and tray lift motors A833-4
(3) Paper feed clutch A833-5
(3) Relay clutch A833-5
(4) Paper feed unit A833-6

20-BIN SORTER (A834)

1. OVERALL MACHINE INFORMATION A834-1
1.1 SPECIFICATIONS A834-1
1.2 COMPONENT LAYOUT A834-3
1.2.1 MECHANICAL COMPONENT LAYOUT A834-3
1.2.2 DRIVE LAYOUT A834-4
1.2.3 ELECTRICAL COMPONENT DESCRIPTION A834-5

2. DETAILED DESCRIPTIONS A834-6
2.1 BASIC OPERATION A834-6
2.1.1 NORMAL MODE AND SORT/STACK MODE A834-6
Normal (Proof) Mode A834-6
Sort Mode A834-6
Stack Mode A834-7
2.1.2 STAPLE MODE A834-8
Mechanism A834-8
Automatic Stapling A834-8
Manual Stapling A834-8
2.1.3 BIN DRIVE MECHANISM A834-9
2.1.4 BIN HOME POSITION A834-10
2.1.5 JOGGER MECHANISM A834-11
2.1.6 GRIP ASSEMBLY A834-12
2.1.7 STAPLER UNIT A834-13
2.1.8 STAPLER SWITCH A834-14
Staple Mode Disabling Conditions A834-14
2.1.9 PAPER FEED AND MISFEED DETECTION TIMING A834-15
Proof ModeA4 sideways, five copies, 150 mm/s A834-15
Sorter ModeA4 sideways, two copies a of two-page original, 150 mm/s A834-15

Staple ModeA4 sideways, two copies of a two-page original, after sorting, 150 mm/s A834-16
2.1.10 JAM DETECTION A834-17
Paper JamA4 sideways A834-17
Staple Jam A834-17

3. REPLACEMENT AND ADJUSTEMENT A834-18
3.1 EXTERIOR COVER REMOVAL A834-18
3.1.1 FRONT COVER A834-18
3.1.2 REAR COVER A834-18
3.1.3 TOP COVER A834-18
3.1.4 LOWER COVER A834-18
3.2 STAPLER UNIT REMOVAL A834-19
3.3 GRIP ARM REPLACEMENT A834-20
3.4 BIN REMOVAL A834-21
3.5 TRANSPORT MOTOR REMOVAL A834-22

10-BIN SORTER (A555)

1. SPECIFICATIONS A555-1

2. COMPONENT LAYOUT A555-3
2.1 MECHANICAL COMPONENT LAYOUT A555-3
2.2 DRIVE LAYOUT A555-4
2.3 ELECTRICAL COMPONENT DESCRIPTION A555-5

3. BASIC OPERATION A555-6
3.1 NORMAL MODE AND SORT/STACK MODE A555-6
3.2 STAPLE MODE A555-8
3.3 BIN DRIVE MECHANISM A555-10
3.4 BIN HOME POSITION A555-11
3.5 JOGGER MECHANISM A555-12
3.6 GRIP ASSEMBLY A555-13
3.7 STAPLER UNIT A555-14
3.8 STAPLER SWITCH A555-15
3.9 PAPER FEED AND MISFEED DETECTION TIMING A555-16
3.10 JAM DETECTION A555-18

4. SERVICE TABLES A555-19
4.1 DIP SWITCHES A555-19
4.2 TEST POINTS A555-20
4.3 LED A555-20
4.4 VARIABLE RESISTOR A555-20

5. REPLACEMENT AND ADJUSTMENT A555-21
5.1 EXTERIOR COVER REMOVAL A555-21
5.2 STAPLE UNIT REMOVAL A555-21
5.3 GRIP ARM REPLACEMENT A555-22

5.4 BIN REPLACEMENT A555-23
5.5 TRANSPORT MOTOR REPLACEMENT A555-24
5.6 BIN JAM SENSOR ADJUSTMENT A555-25

3-BIN SORTER (A849)

1. SPECIFICATIONS A849-1

2. COMPONENT LAYOUT A849-2
2.1 MECHANICAL COMPONENT LAYOUT A849-2
2.2 DRIVE LAYOUT A849-3
2.3 ELECTRICAL COMPONENT DESCRIPTION A849-4

3. DETAILED SECTION DESCRIPTIONS A849-5
3.1 BASIC OPERATION A849-5
3.1.1 FACE-UP MODE A849-5
3.1.2 FACE-DOWN MODE A849-6
3.2 1ST BIN UP/DOWN MECHANISM A849-7
3.3 1ST BIN SIDE-TO-SIDE SHIFT MECHANISM A849-8
3.4 PAPER FEED AND MISFEED DETECTION TIMING A849-9
3.5 JAM DETECTION A849-11

4. REPLACEMENT AND ADJUSTMENT A849-12
4.1 EXTERIOR COVER AND BIN REMOVAL A849-12
4.2 TRAY LIFT/SHIFT MOTOR ASSEMBLY REMOVAL A849-13
4.3 ENTRANCE MOTOR REPLACEMENT A849-14
4.4 EXIT MOTOR REPLACEMENT A849-15
4.5 STACK HEIGHT SENSOR AND 1ST EXIT SENSOR REPLACEMENT A849-16
4.6 2ND / 3RD EXIT SENSOR AND INVERTER SENSOR REPLACEMENT A849-18

FPU (A846)

1. SPECIFICATIONS A846-1

2. ELECTRICAL COMPONENT LAYOUT AND DESCRIPTIONS A846-2

3. SECTIONAL DESCRIPTIONS A846-3
3.1 OVERVIEW A846-3
3.2 SHADING A846-4
3.3 MIRROR UNIT A846-5

APPENDIX

1. TIMMING CHART
   A4 SIZE B/W MODE 1
   A4 SIZE FULL COLOR MODE 2
   A3 SIZE B/W MODE 3
   A3 SIZE FULL COLOR MODE 4

2. SP MODE TABLE

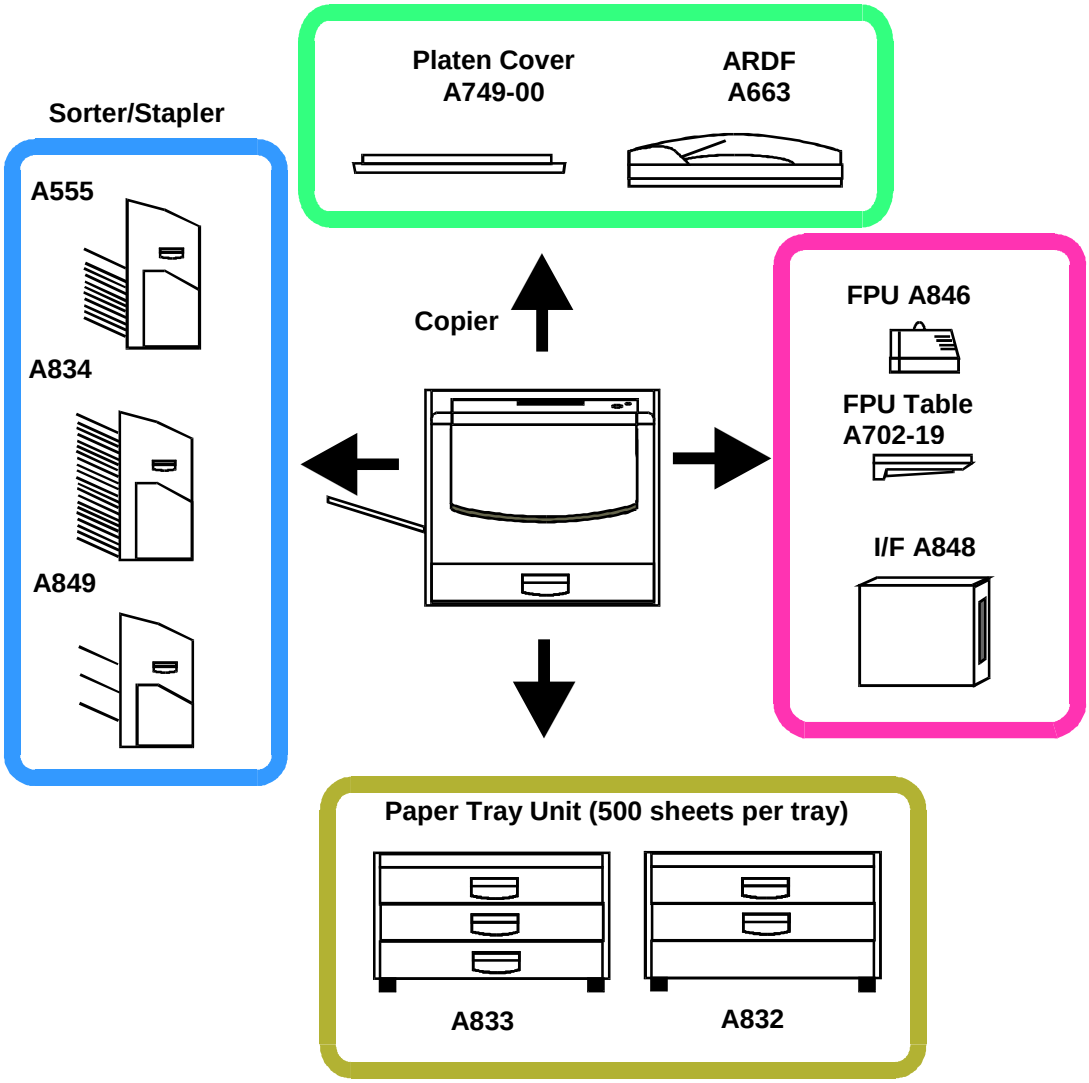
3. SC CODE TABLE

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

1.1.1 MACHINE CONFIGURATION

	A258	A259	A260
Operation Panel	40-digit 4-line LCD Hard Key Type	144 mm x 192 mm (10.4 inch) Color Touch Panel Display	
Paper Tray Unit	500 sheets	Duplex	
Edit Function	No	No	Yes



A259V501.WMF

1.1.2 GENERAL SPECIFICATIONS

Configuration: Desktop

Copy Process: Dry electrostatic transfer system

Resolution: 400 dpi; Printer mode 600 dpi

Gradations: 256 gradations

Originals: Sheet/Book/Object

Original Size: Maximum 11" x 17" /A3

Copy Paper Size:

	Maximum	Minimum
Paper Tray Feed (A258 only)	11" x 17" /A3	5 1/2 x 8 1/2 /A5(L)
Bypass Feed	12" x 18"/305 mm x 457 mm	A6(L)

Copy Paper Weight:

Paper Tray Feed	17 to 28 lbs.	64 to 105 g/m^2
Bypass Feed	14 to 43 lbs.	52 to 160 g/m^2
Auto Duplex Tray	17 to 28 lbs.	64 to 105 g/m^2

Reproduction Ratios:

	8 1/2" x 11"LT/11" x 17"DLT version	A4/A3 version
Enlargement	121, 129, 155, 200, 400%	115, 122, 141, 200, 400%
Full size	100%	100%
Reduction	25, 50, 65, 73, 78, 85, 93%	25, 50, 65, 71, 75, 82, 93%
Programmable	2 user ratios	2 user ratios

Zoom: From 25% to 400 % in 1% steps.

Copying Speed:

	8 1/2" x 11" (S) /A4	**11" x 17"/A3**
Normal Mode		
Full Color (4 scans)	6 cpm	3 cpm
Single Color (C, M Y, K)	A258: 21 cpm A259/260: 28 cpm	A258: 11 cpm A259/260: 14 cpm
Single Color (B, G)	9 cpm	4.5 cpm
Single Color (R)	7 cpm	3.5 cpm
OHP/Thick Paper Mode		
Full Color (4 scans)	3 cpm	1.5 cpm
Single Color (C, M Y, K)	5 cpm	2.5 cpm
Single Color (G, B)	4 cpm	2 cpm
Single Color (R)	3.5 cpm	1.5 cpm

Duplexing: Same as Normal Mode speed in the above table

Printer Speed: 2/3 the speeds shown in the above table

First Copy Time (A258/259/260):

	8 1/2" x 11" (S) /A4
Normal Mode	
Full Color (4 scans)	22.4 seconds
Single Color (K)	8 seconds
Single Color (C, M, Y)	10 seconds
Single Color (B, G, R)	16 seconds
OHP/Thick Paper Mode	
Full Color (4 scans)	35 seconds
Single Color (K)	23 seconds
Single Color (C, M, Y)	25 seconds
Single Color (B, G, R)	27 seconds

Warm-up Time: Approx. 7 minutes (at 68°F / 20°C)

Duplexing:

Basic Manual Duplex Model (A258):	Manual duplexing in full color and single color modes
Basic Auto Duplex Model (A259):	Manual & auto duplexing in full color and single color modes
Edit Auto Duplex Model (A260):	Manual & auto duplexing in full color and single color modes

Duplexing can be done on 64-105 g/m^2 paper.

Manual duplexing can be done through the bypass table only, and the user should press the Duplex Side 2 key before copying the reverse side.

Non-Reproduction Area:

Leading Edge:	0.2" ± 0.08" (5 mm ± 2 mm)
Side:	0.08" ± 0.08" (2 mm ± 2 mm)/ Total less than 0.16" (4 mm)
Trailing Edge:	2.0 mm + 2.0/-1.5 mm

Copy Number Input:	Number keys, 1 to 99
Copy Number Input (Auto Duplex):	Number keys Single Color - 1 to 50: smaller than A3, 11" x 17" 1 to 30: A3, 11" x17" Full Color 1 to 20: all sizes
Image Density:	Auto/Manual (9 steps)
Automatic Reset:	Yes (10 to 990 seconds or Off)
Paper Capacity:	Tray: 500 sheets x 1 tray (Basic Manual Duplex Model: A258) Bypass: Normal paper (80 g/m^2/20 lb) 50 sheets OHP 20 sheets Adhesive paper 1 sheet
Toner Replenishment:	Toner Addition (K, Y, C, M) (220 g/cartridge)
Copy Tray Capacity:	100 sheets (11" x 17"/A3 and smaller)
Power Source:	US: 120V/12A/60Hz, Europe/Asia: 220-240V/8A/50,60 Hz Taiwan: 110 V/12A/60Hz
Maximum Power Consumption:	1.5 kVA

Dimensions (without Platen Cover):

	Width	Depth	Height
A258	620 mm 24.4"	680 mm 26.8"	602 mm 23.7"
A259	620 mm 24.4"	757 mm 29.8"	602 mm 23.7"
A260	620 mm 24.4"	757 mm 29.8"	602 mm 23.7"

Height: 1,018 mm with optional paper tray unit

Weight: Manual Duplex: 105 kg (231.3 lbs.)
Auto Duplex: 108 kg (237.9 lbs.)

Optional Equipment: Automatic Document Feeder (ARDF): A663
Sorter Stapler: A555 (10 bins), A834 (20 bins),
Sorter: A849 (3 bins)
Film Projector: A846
Holder for Film Projector Unit: A702-19
Paper Tray Unit: A832 (2 trays), A833 (3 trays)
Key Counter
Platen Cover: A749-00
Original Tray: A430-07 (Type F)

1.1.3 PLATEN/ARDF ORIGINAL SIZE DETECTION

Size (width x length) [mm]	Platen		ARDF	
	Inches	Metric	Inches	Metric
A3 (297 x 420) L	No	Yes	No	Yes
B4 (257 x 364) L	No	Yes	No	Yes
A4 (210 x 297) L	No	Yes	Yes	Yes
A4 (297 x 210) S	No	Yes	Yes	Yes
B5 (182 x 257) L	No	Yes	No	Yes
B5 (257 x 182) S	No	Yes	No	Yes
A5 (148 x 210) L	No	No*	No	Yes
A5 (210 x 148) S	No	No	No	Yes
B6 (128 x 182) L	No	No	No	Yes
B6 (182 x 128) S	No	No	No	Yes
11" x 17" (DLT)	Yes	No	Yes	Yes
11" x 15"	No	No	Yes	No
10" x 14"	No	No	Yes	Yes
8.5" x 14" (LG)	Yes	No	Yes	No
8.5" x 13" (F4)	No	No	Yes	Yes
8.25" x 13"	No	No	No	No
8" x 13"(F)	No	Yes	Yes	No
8.5" x 11" (LT)	Yes	No	Yes	Yes
11" x 8.5" (LT)	Yes	No	Yes	Yes
8" x 10.5"	No	No	No	No
8" x 10"	No	No	Yes	No
5.5" x 8.5" (HLT)	No*	No	Yes	No
8.5" x 5.5" (HLT)	No	No	Yes	No
A6 (105 x 148) L	No	No	No	No

*: For A5 lengthwise/HLT, SP4-303 can be used to select “Cannot detect original size” or “A5 lengthwise/5.5" x 8.5"(HLT)”.

1.1.4 COPY PAPER SIZE

Size (width x length) [mm]	Trays in the main body				Bypass	Optional S.Stapler
	Paper Tray (A258)		Duplex Tray (A259/A260)		All versions (A258/ 259/260)	
	Inches	Metric	Inches	Metric		
A3 (297 x 420) L	No	Yes	Yes	Yes	Yes	Yes
B4 (257 x 364) L	No	Yes	Yes	Yes	Yes	Yes
A4 (210 x 297) L	Yes	Yes	Yes	Yes	Yes	Yes
A4 (297 x 210) S	Yes	Yes	Yes	Yes	Yes	Yes
B5 (182 x 257) L	No	Yes	No	Yes	Yes	Yes
B5 (257 x 182) S	No	Yes	No	Yes	Yes	Yes
A5 (148 x 210) L	No	Yes	No	No	Yes	Yes (1)
A5 (210 x 148) S	No	No	Yes	Yes	Yes	Yes (2)
B6 (128 x 182) L	No	No	No	No	Yes	Yes (1)
B6 (182 x 128) S	No	No	No	No	No	No
12” x 18”	No	No	No	No	Yes	Yes (3)
11" x 17" (DLT)	Yes	Yes	Yes	Yes	Yes	Yes
11" x 15"	Yes	No	Yes	No	Yes	Yes
10" x 14"	Yes	No	Yes	No	Yes	Yes
8.5" x 14" (LG)	Yes	No	Yes	No	Yes	Yes
8.5" x 13" (F4)	Yes	Yes	Yes	Yes	Yes	Yes
8.25" x 13"	No	No	Yes	Yes	Yes	Yes
8" x 13"(F)	No	No	Yes	Yes	Yes	Yes
8.5" x 11" (LT)	Yes	Yes	Yes	Yes	Yes	Yes
11" x 8.5" (LT)	Yes	Yes	Yes	Yes	Yes	Yes
8" x 10.5"	No	No	Yes	No	Yes	Yes
8" x 10"	Yes	No	Yes	Yes	Yes	Yes
5.5" x 8.5" (HLT)	No	No	No	No	Yes	Yes (1)
8.5" x 5.5" (HLT)	Yes	No	Yes	Yes	Yes	Yes (2)
A6 (105 x 148) L	No	No	No	No	Yes	Yes (2)

Yes (1): Stapling is not allowed.
Yes (2): Using the proof tray only. Sorter bins cannot be used.

Yes (3): 20-bin sorter (A834): Stapling is not allowed.

10-bin sorter (A555): Not available

1.1.5 APS PAPER SIZES AVAILABLE

— For metric machines —

	200 ~ 174	173 ~ 164	163 ~ 142	141 ~ 123	122 ~ 116	115 ~ 101	100 ~ 94	93 ~ 88	87 ~ 83	82 ~ 76	75 ~ 72	71 ~ 66	65 ~ 62	61 ~ 58	57 ~ 51	50 ~
A3	—	—	—	—	—	—	A3	—	B4	—	—	A4L	8.5 x13	B5L	—	A5L
B4	—	—	—	—	—	A3	B4	—	—	A4L	8.5 x13	B5L	—	—	A5L	—
A4L	—	—	—	A3	B4	—	A4L	8.5 x13	B5L	—	—	A5L	—	—	—	—
B5L	—	—	A3	B4	—	A4L	B5L	—	—	A5L	—	—	—	—	—	—
A5L	A3	B4	—	A4L	B5L	—	A5L	—	—	—	—	—	—	—	—	—
A4S	—	—	—	—	—	—	A4 S	—	B5 S	—	—	A5 S	—	—	—	—
B5S	—	—	—	—	—	A4 S	B5 S	—	—	A5 S	—	—	—	—	—	—
A5S	—	—	—	A4 S	B5 S	—	A5 S	—	—	—	—	—	—	—	—	—
8.5 x 11	—	—	—	—	—	—	8.5 x11	—	—	—	—	—	—	—	—	—
11 x 8.5	—	—	—	—	—	—	11 x8.5	—	—	—	—	—	—	—	—	—
8.5 x 13	—	—	—	—	A3	—	8.5 x13	—	—	A4L	B5L	—	—	—	—	A5L
11 x 15	—	—	—	—	—	—	11 x15	—	—	—	—	—	—	—	—	—

: Not allowed in platen cover mode. L: Lengthwise S: Sideways

— For standard machines (in inches)—

	200 ~ 177	176 ~ 156	155 ~ 130	129 ~ 122	121 ~ 101	100 ~ 94	93 ~ 86	85 ~ 78	77 ~ 75	74 ~ 66	65 ~ 51	50 ~
11x17	—	—	—	—	—	11x17	11x17	11x15	8.5 x14	—	8.5 x11	5.5 x8.5
11x15	—	—	—	—	—	11x15	11x15	—	8.5 x14	8.5 x11	—	5.5 x8.5
8.5x14	—	—	—	—	11 x17	8.5 x14	—	—	8.5 x11	—	—	5.5 x8.5
8.5x11	—	—		11x17	—	8.5 x11	—	—	—	—	5.5 x8.5	—
5.5 x8.5	11 x17	11 x15	8.5 x14	8.5 x11	—	5.5 x8.5	—	—	—	—	—	—
8.5 x5.5	—	—	—	11 x8.5	—	8.5 x5.5	—	—	—	—	—	—
11x8.5	—	—	—	—	—	11 x8.5	—	—	—	—	8.5 x5.5	—
8x10	—	—	—	11x17	10x14	8x10	—	—	—	—	5.5 x8.5	—
10x14	—	—	—	—	—	10x14	—	8.5 x14	8.5 x11	—	—	5.5 x14
8x13	—	—	—	11x17	—	8x13	—	—	—	—	5.5 x8.5	—

: Not allowed in platen cover mode.

NOTE: 1) The tables indicate the copy paper size for each original for 50 to 200 % zoom ratios.
2) After specifying a zoom ratio, APS automatically selects a paper size that guarantees the quality of the magnified copy image, if there is a paper size available for the equivalent standard reproduction ratio.
3) If there is no paper that corresponds to the detected size, the machine displays the message "Set xx paper in tray" and stops the job (copying is still possible).
4) For "—" in the above tables, the machine displays the message "Cannot detect original size" and stops the job (copying is still possible). The selected paper feed tray does not change.
5) When less than 49% or more than 201% is selected, APS behaves in accordance with note 4 above.
6) APS also supports the by-pass feed table (except for non-standard paper sizes). When the paper size selected by APS can only be fed from the by-pass feed table, the machine displays a warning to instruct the user to use the by-pass feed table.
7) APS does not support A6, B6, and A5.

1.1.6 NOISE EMISSION

Sound pressure level

The measurements were made in accordance with ISO 7779 at the operator positions.

Copier only	Full system*
Less than 38.5 dB (A)	Less than 55 dB (A)

*: Full system: Copier with document feeder, 500 sheets x 3 trays unit, FPU, and a sorter stapler.

Sound power level

The measurements were made in accordance with ISO 7779.

	Copier only	Full system*
Stand-by	Less than 55 dB (A)	Less than 59 dB (A)
Copying (This value is for the black copy mode.)	Less than 68 dB (A)	Less than 72 dB (A)

*: Full system: Copier with document feeder, 500 sheets x 3 trays unit, FPU, and a sorter stapler.

1.1.7 POWER CONSUMPTION

(1) Maximum power consumption
1.5 kVA

(2) Average power consumption

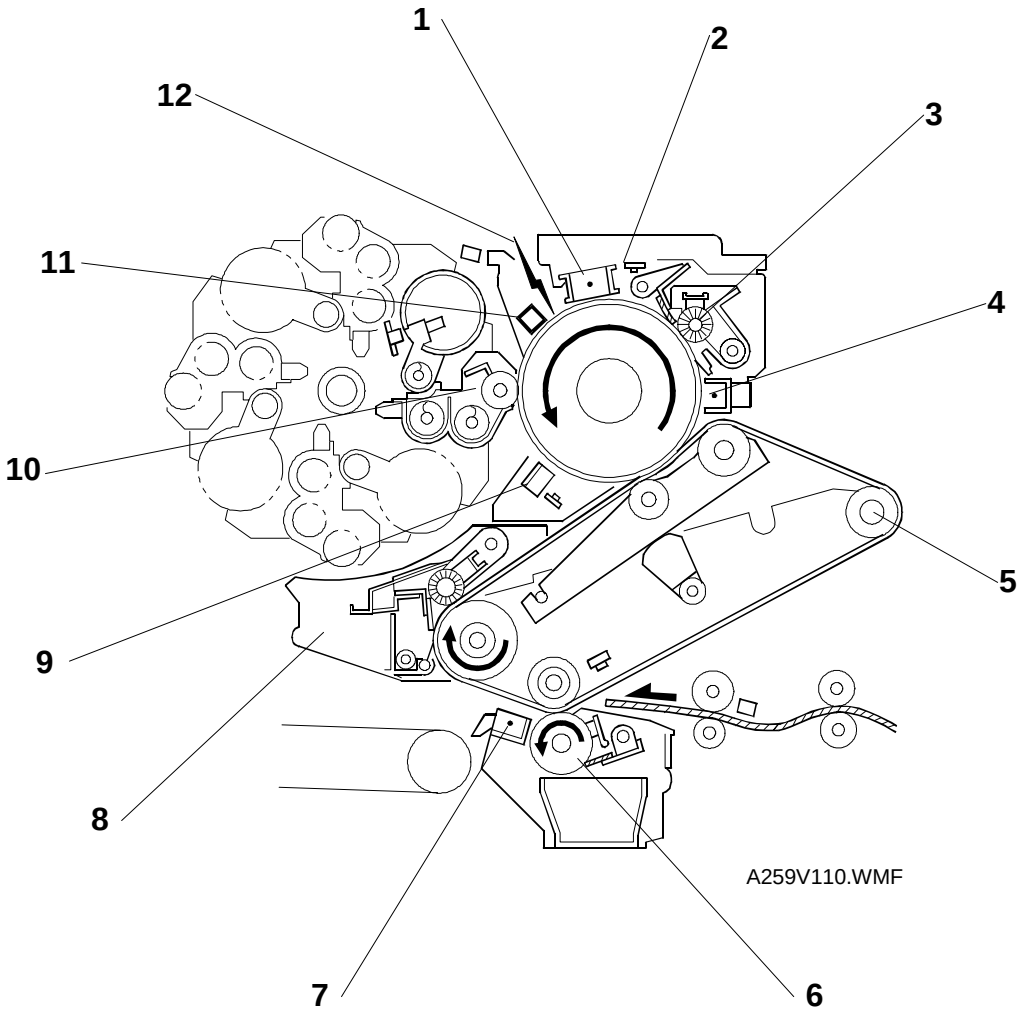
	A258/A259/A260 Copiers
Standby	0.4 kW
Warm-up	1.3 kW
Copying	1.1 kW (B/W A4 ▯) 0.6 kW (full color A4 ▯)
Energy Saver Mode	Value for standby minus 25 W

1.1.8 DISPLAY EDITOR SPECIFICATIONS

Scanned image	• The copier's scanner scans the image. • Maximum A3/DLT (11" x 17"): Reduced image display
Displayed image	• 144 x 192 mm, 256 colors (8 bits/dot) • 640 x 480 dots, 0.33 mm/dot Reduces the dpi of scanned images to approximately 25 dpi and displays the entire image • Zoom display: 4 levels (200%, 264%, 400%, 528%)
Area specification procedure	• Move the arrow on the screen by using the cursor key and enter a point by pressing the coordinate entry key.

1.2 MECHANISM OVERVIEW

1.2.1 IMAGE GENERATION PROCESS



(1) Drum charge

The charge corona applies a negative charge to the OPC drum and the grid ensures that this charge is even.

(2) Quenching

After cleaning, the OPC is fully exposed to light from an array of red LEDs, quenching the residual charge on the OPC drum in preparation for the next copy cycle.

(3) Drum Cleaning

The cleaning brush increases drum cleaning efficiency by applying lubricant to the OPC drum. The cleaning blade scrapes the residual toner off the OPC drum.

(4) PCC (Pre-cleaning corona)

The PCC discharges the photoconductor drum and applies AC and negative DC to reduce the charge holding the residual toner to the drum, thereby improving the efficacy of the cleaning brush.

(5) Belt transfer

Positive charge applied to the back of the transfer belt transfers the toner image on the OPC drum to the transfer belt.

(6) Paper transfer

The negatively charged toner image is transferred to the paper by giving a positive charge to the back of the paper while the paper and transfer belt are held in close contact.

(7) Paper separation corona

After transfer, the separation corona quenches the negative charge on the paper to reduce the attraction between the belt and paper. The curvature of the belt causes the paper to separate from the transfer belt.

(8) Belt cleaning unit and lubricant application brush

The brush applies lubricant, which makes it easier for the counter blade to scrape excess toner off the transfer belt.

(9) ID sensor

The ID sensor detects the density of the sensor patches developed on the OPC drum. The signal from the ID sensor is used for process control and toner supply control.

(10) Development

The latent image on the drum attracts the negatively charged toner. Toner is preferentially attracted to those places on the drum surface where the laser reduced the negative charge. The development units for each color are included in the revolver unit.

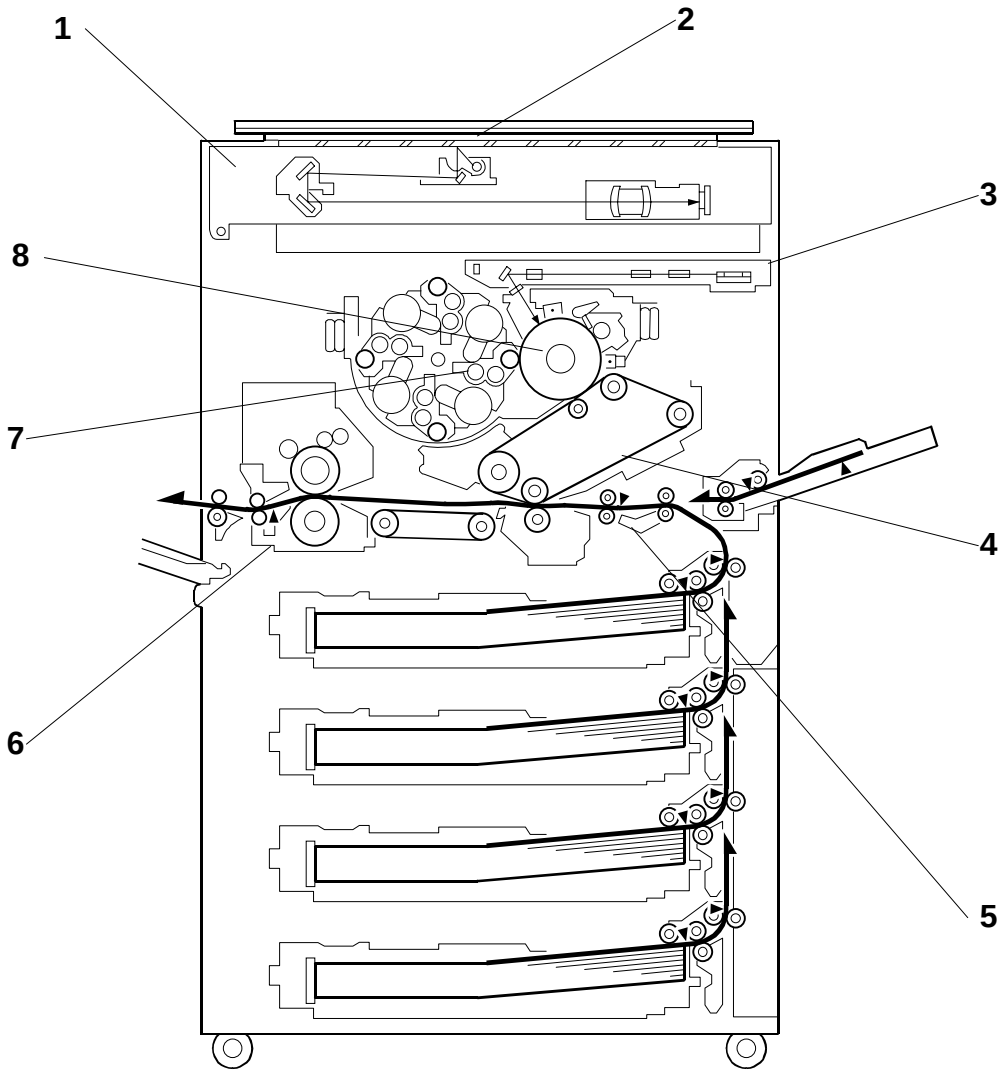
(11) Potential sensor

The potential sensor detects the electrical potential (the strength of the electric field) on the photoconductor drum for process control.

(12) Laser exposure

The polygon mirror reflects the laser beam emitted from the laser diode and projects it onto the drum through the f-theta lens, drum mirror, and toner shield glass. The laser output varies in intensity to correspond to the image data, and this forms a latent image on the drum.

1.3 MAJOR UNIT LAYOUT AND PAPER FEED PATH



A259V109.WMF

(1) Scanner

1. 400 dpi, 10-bit scanning in both main and sub-scan directions
2. 3-line CCD
3. Halogen exposure lamp
4. 5-phase stepper motor drive
5. Dual-side continuous scan (A4) support (in continuous copy mode)

(2) Operation panel (A259, A260)

1. 10.4-inch (640 x 480) color LCD (8-bit) touch-panel
2. An additional operation panel is installed when the printer controller is installed.

(3) Laser unit

1. Optics: 6-sided polygon mirror + 2 f-theta lenses + BTL
2. Polygon mirror motor (16535 rpm) with ball bearing
3. 400 dpi (8 bits per pixel for each color) in copy mode
   600 dpi (8 bits per pixel for each color) in printer mode
4. Modulation: PM + PWM

(4) Transfer belt

1. Transfer belt: Always in contact with the drum
2. Belt transfer: Indirect application of voltage with a roller
3. Paper transfer: Roller transfer
4. Registration: Synchronization by the transfer belt H.P. sensor
5. Drive: Synchronized with the drum (same motor)
6. Separation: Curvature separation + corona unit
7. Transfer cycle: 1 belt rotation/A4, 2 rotations/A3
8. Belt cleaning: Counter blade
9. Lubrication: Brush roller with lubricant bar

(5) Paper feed/transport system

1. Paper feed (A258)
   - Front loading 500 sheets, 1-layer tray + by-pass feed
2. Transport: Transport belt + fan
3. Duplexing: Duplex unit installed as a standard component (A259/A260 only)
4. Paper tray (optional): Holds 500 sheets x 2 trays or 500 sheets x 3 trays.

(6) Fusing and paper exit

1. Fusing: Silicone roller fusing
2. Oil application method: Double roller system
3. Cleaning: Cleaning rollers (for hot and pressure rollers)
   Europe/Asia: Cleaning roller for hot roller, cleaning blade for pressure roller
4. OHP/thick paper speed change

(7) Development and toner supply

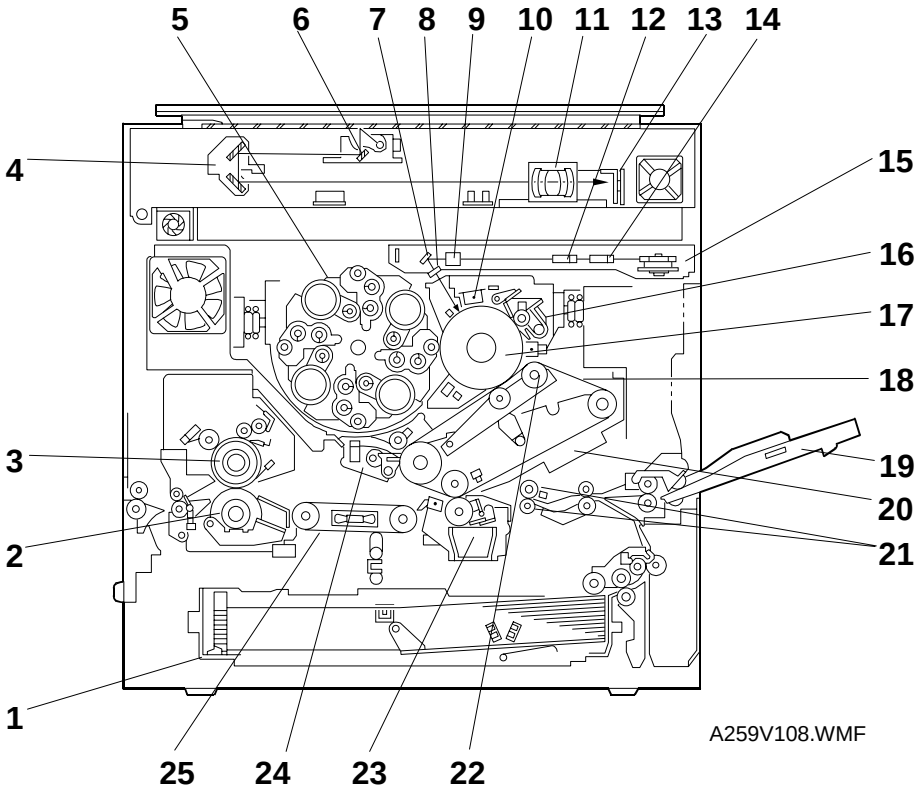
1. Development: Two-component magnetic brush development
2. Development switching: Revolver system
3. Image density control: ID sensor + process control
4. Toner supply: Screw-in bottle (220 g)
5. Toner supply unit: Front of developer unit (rotation type)

(8) Drum unit

1. The drum unit contains the photoconductor drum, charge corona unit, and cleaning unit.
2. Charge corona unit: Single-wire scorotron
3. Quenching lamp: LED array
4. Drive: Synchronized with the transfer belt (DC brushless motor + flywheel)
5. Potential sensor included

1.4 PARTS LAYOUT

1.4.1 MECHANICAL COMPONENT LAYOUT



1. Paper Tray (A258)/Duplex Tray (A259/A260)
2. Pressure Roller
3. Hot Roller
4. 2nd Scanner
5. Revolver Development Unit
6. 1st Scanner
7. Drum Mirror
8. Toner Shield Glass
9. BTL (Barrel Torroidal Lens)
10. Charge Corona Unit
11. Scanner Lens
12. 2nd F-theta Lens
13. CCD Board
14. 1st F-theta Lens
15. Polygon Mirror
16. Drum Cleaning Unit
17. OPC Drum
18. Transfer Belt
19. By-pass Feed Table
20. Transfer Belt Unit
21. Registration Roller
22. Transfer Belt Bias Roller
23. Paper Transfer Unit
24. Belt Cleaning Unit
25. Transport Belt

1.4.2 ELECTRICAL COMPONENT LAYOUT

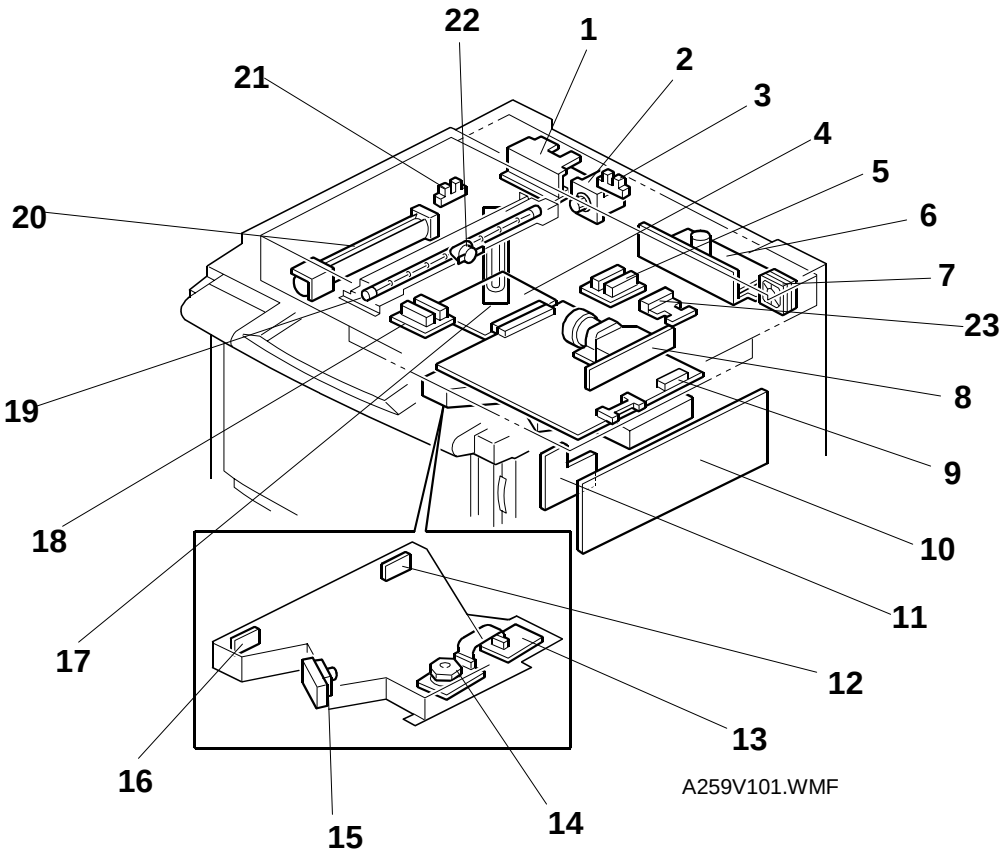


Diagram 1

1. Scanner Motor Drive Board
2. Scanner Motor
3. Platen Cover Position Sensor
4. IDU Board
5. Original Length Sensor
6. Lamp Regulator
7. Scanner Exhaust Fan
8. CCD Board (SBU)
9. Scanner IPU Board
10. Main Control Board
11. LD (Laser Diode) Main Control Board
12. Laser Synchronizing Detector Board 2
13. Polygon Motor Drive Board
14. Polygon Motor
15. LD (Laser Diode) Drive Board
16. Laser Synchronizing Detector Board 1
17. Optics Anti-condensation Heater
18. Original Width Sensor
19. Exposure Lamp
20. Optics Cooling Fan
21. Scanner H.P. Sensor
22. Thermostat
23. Original Length Sensor-Sub

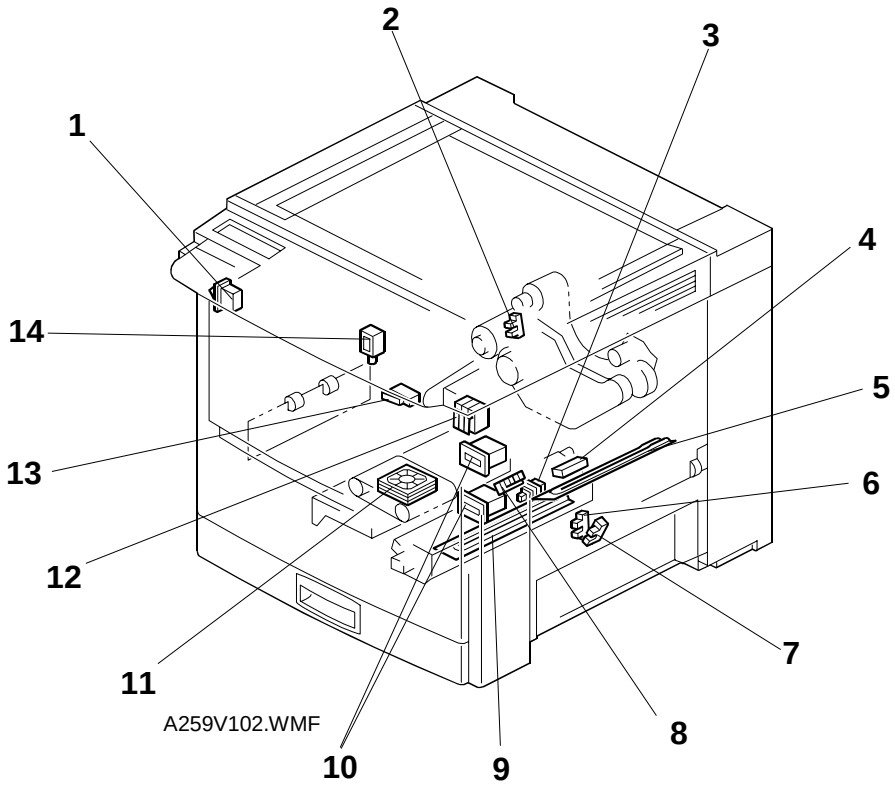


Diagram 2

1. Main Power Switch
2. Belt Cleaning H.P. Sensor
3. Paper Tray Detector Switch
4. Transfer Belt Home Position Sensor
5. Transfer Belt Heater
6. Paper Height Sensor-1
7. Paper Height Sensor-2
8. Paper Transfer H.P. Sensor
9. Paper Transfer Unit Heater
10. Counters
11. Transport Fan
12. Front Door Switch
13. Paper Exit Door Switch (A259/A260 only)
14. Junction Gate Solenoid (A259/A260 only)

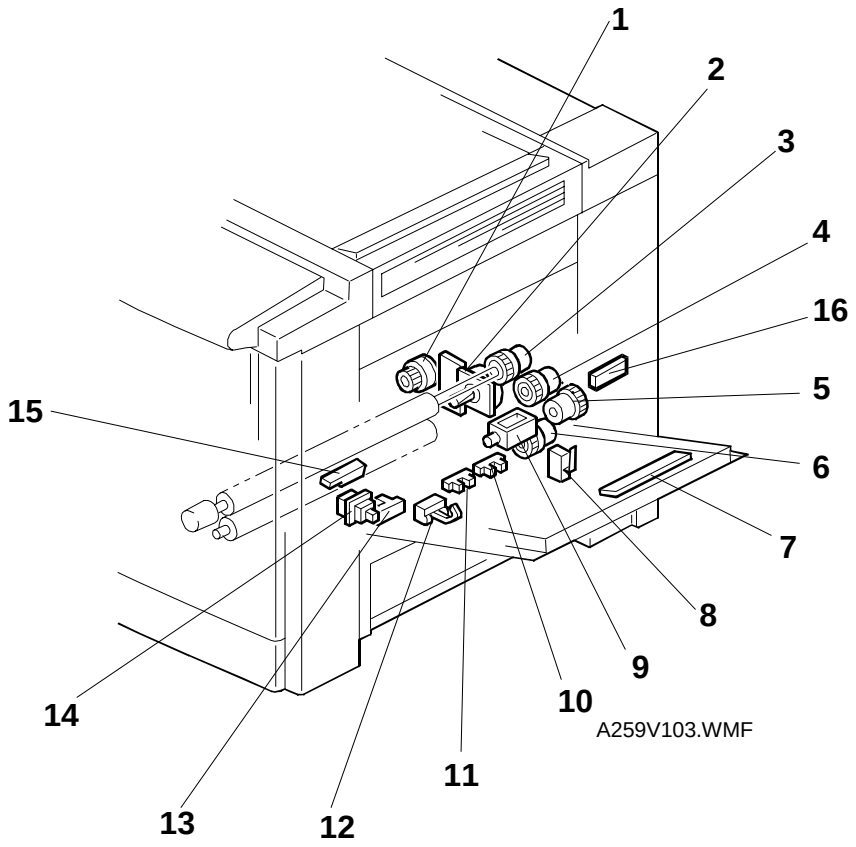


Diagram 3

1. Paper Transfer Positioning Clutch
2. Paper Feed Motor
3. Registration Clutch
4. Relay Clutch
5. By-pass Feed Clutch
6. Paper Feed Clutch
7. By-pass Paper Width Detection Board
8. Vertical Transport Switch
9. By-pass Pick-up Solenoid
10. Upper Limit Sensor
11. Paper End Sensor
12. Relay Sensor
13. By-pass Paper End Sensor
14. By-pass Feed Table Switch
15. Registration Sensor
16. Temperature and Humidity Sensor

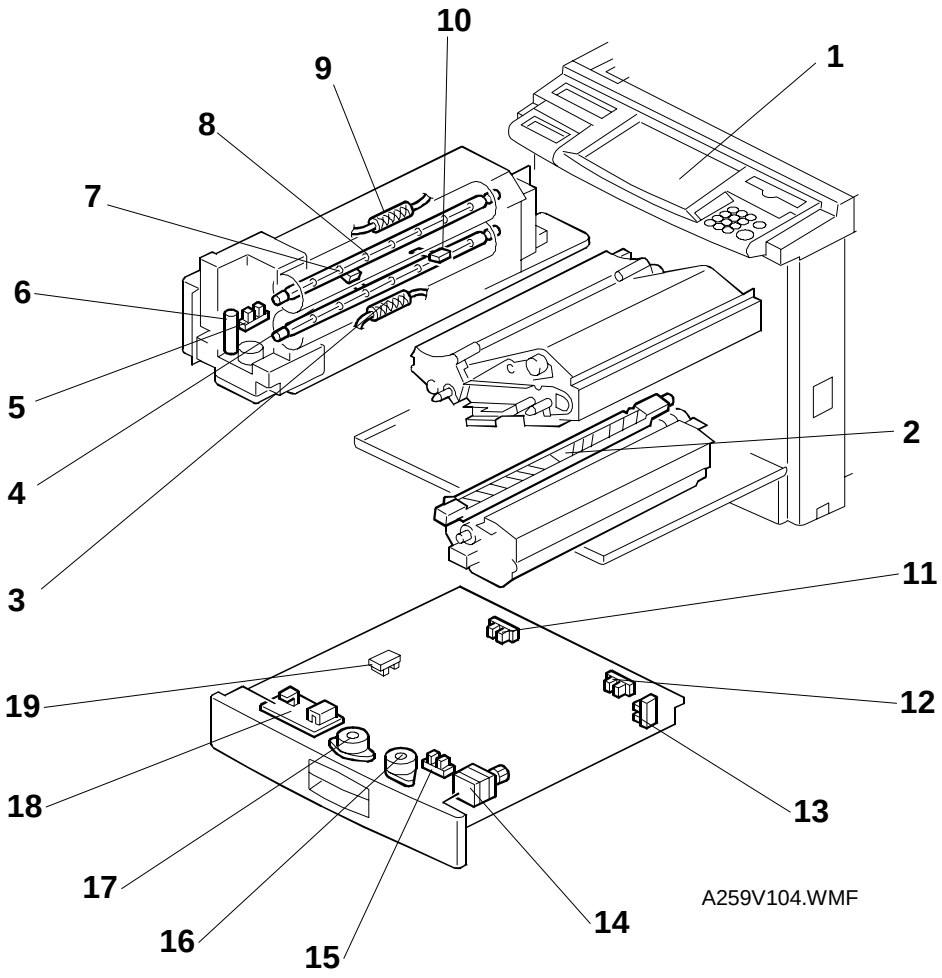


Diagram 4

1. Operation Panel
2. Paper Separation Corona Unit
3. Pressure Roller Thermofuse
4. Pressure Roller Fusing Lamp
5. Paper Exit Sensor
6. Oil End Sensor
7. Hot Roller Thermistor
8. Hot Roller Fusing Lamp
9. Hot Roller Thermofuse
10. Pressure Roller Thermistor
11. Duplex Entrance Sensor
12. Duplex Turn Sensor
13. Duplex Paper End Sensor
14. Duplex Feed Motor
15. Side Fence Jogger HP Sensor
16. Duplex Side Fence Jogger Motor
17. Duplex End Fence Jogger Motor
18. Duplex Control Board
19. End Fence Jogger HP Sensor

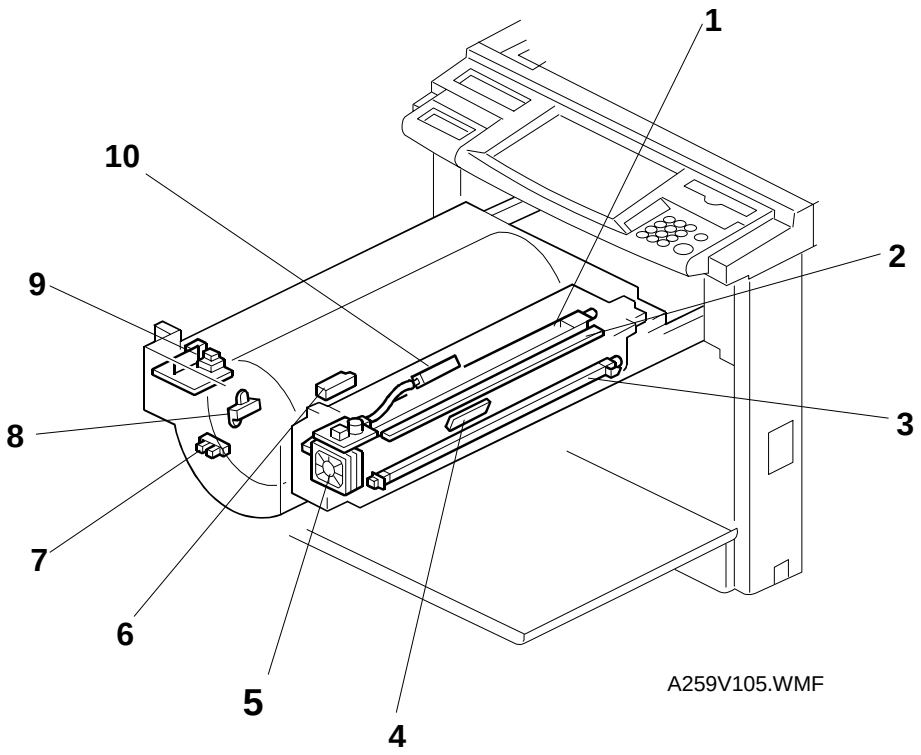


Diagram 5

1. Charge Corona Unit
2. Quenching Lamp
3. PCC (Pre-cleaning Corona)
4. ID Sensor
5. Charge Corona Fan
6. Toner Cartridge Sensor
7. Revolver H.P. Sensor
8. Toner End Sensor
9. High Voltage Supply Board: B
10. Potential Sensor

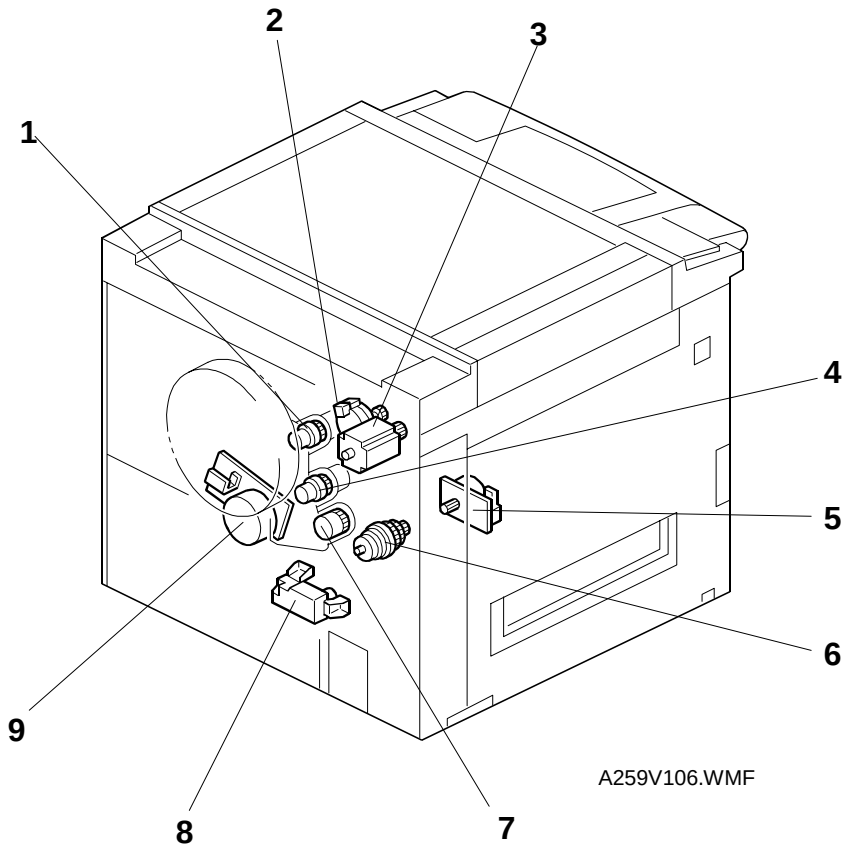


Diagram 6

1. Development Clutch
2. Toner Supply Motor
3. Revolver Motor
4. Belt Lubricant Clutch
5. Fusing Motor
6. Fusing Clutch
7. Belt Cleaning Clutch
8. Tray Lift Motor
9. Drum Motor

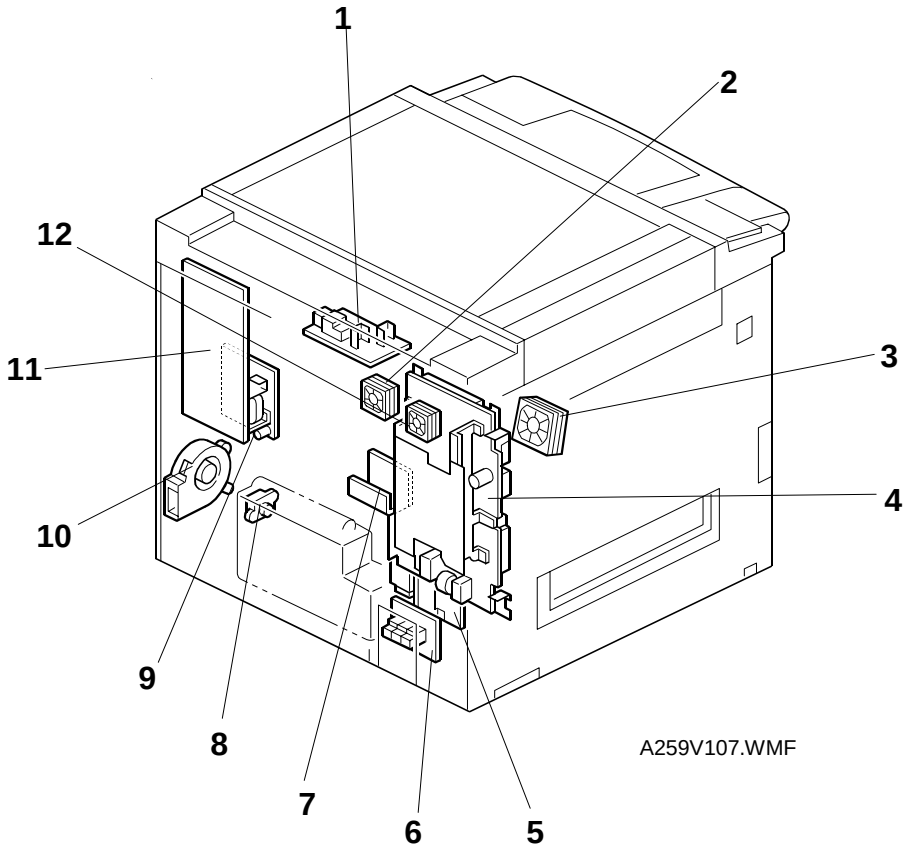
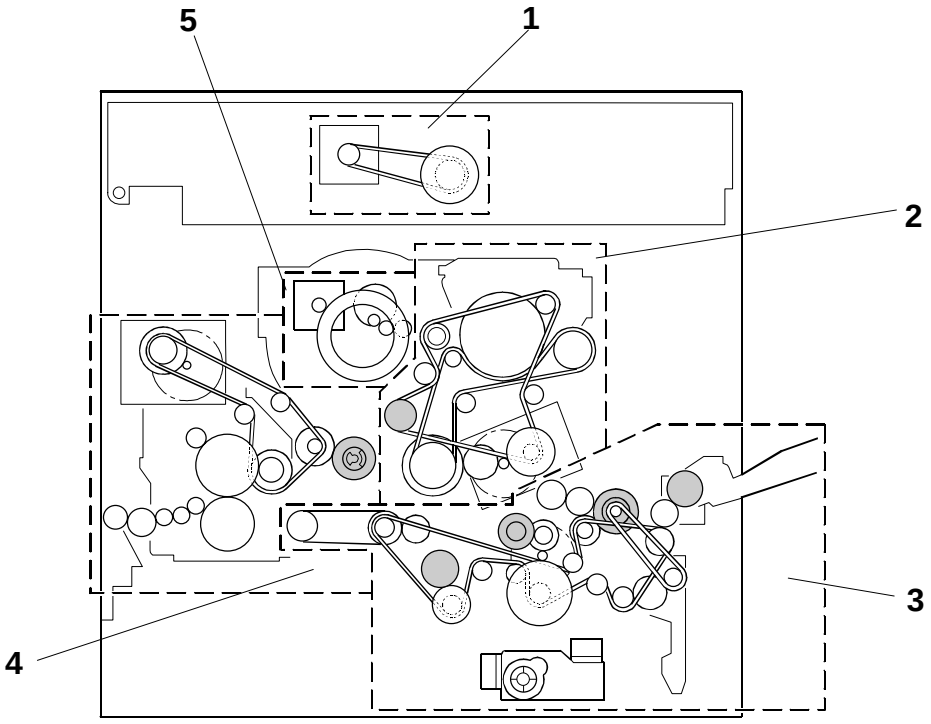


Diagram 7

1. High Voltage Supply Board: C, G
2. Rear Cooling Fan
3. Fusing Unit Fan
4. PSU (Power Supply Unit)
5. High Voltage Supply Board: T2, D
6. CSS/Bank Interface Board
7. Revolver Motor Drive Board
8. Used Toner Sensor
9. High Voltage Supply Board: T1, PCC
10. Main Exhaust Fan
11. I/O (Input/Output) Control Board
12. PSU Fan

1.4.3 DRIVE LAYOUT

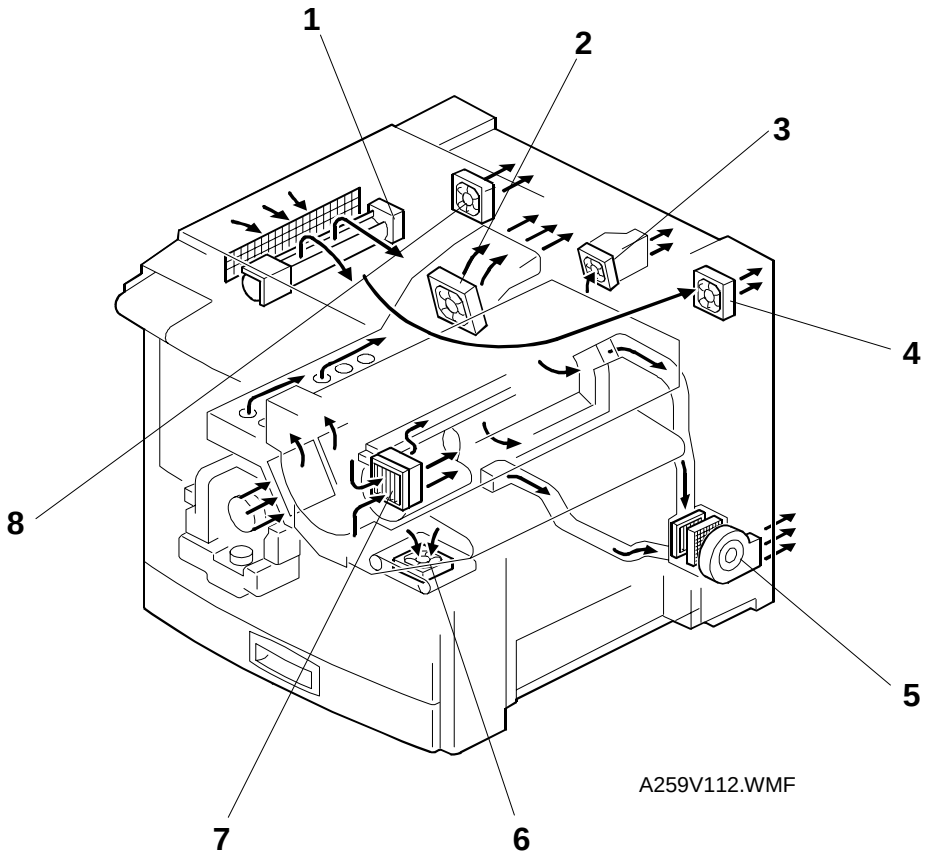


A259V111.WMF

Five motors drive the mechanical components for this machine. The drive sections driven by these five motors are listed below.

1. Scanner Drive
2. Development/Drum/Transfer Belt Drive
3. Paper Feed/Registration/Paper Transfer/Transport Belt Drive
4. Fusing Unit/Paper Exit Drive
5. Revolver Drive

1.4.4 AIR FLOW



1. Optics Cooling Fan
2. Fusing Unit Fan
3. Rear Cooling Fan
4. Scanner Exhaust Fan
5. Main Exhaust Fan
6. Transport Fan
7. Charge Corona Fan
8. PSU Fan

1.4.5 ELECTRICAL COMPONENT DESCRIPTIONS

Printed Circuit Boards

Symbol	Name	Function	Index-No	Location
PCB 2	Lamp regulator	Supplies AC power to the exposure lamp.	1-6	O7
PCB 5	Scanner motor drive board	Supplies DC power to the scanner motor.	1-1	M7
PCB3	SBU	Converts the light reflected from the original into video signals.	1-8	J9
PCB1	PSU	Supplies AC and DC power.	7-4	K4
PCB4	Scanner IPU board	Converts the RGB image signal from the CCD to a KCMY signal and sends it to the LD main control board.	1-9	L8
PCB11	Main control board	Controls the printer sequence.	1-10	J12
PCB6	I/O control board	Interfaces the sensors, clutches, solenoids, and motors in the printer module with the main control board.	7-11	D14
PCB17	LD main control board	Controls the laser power, main scan synchronizing sensors, and process control gamma correction.	1-11	M16
PCB16	LD drive board	Drives the laser diode.	1-15	O17
PCB12	Laser synchronizing detector board 1	Detects laser main scan synchronization while the latent image is being written to the drum.	1-16	O15
PCB13	Laser synchronizing detector board 2	Detects laser main scan synchronization while the latent image is being written to the drum.	1-12	O15
PCB21	IDU	Analyzes images for anti-counterfeiting.	1-4	M14
PCB18	By-pass paper width detection board	Detects the paper width on the by-pass feed table.	3-7	A10
PCB9	High voltage supply board: T2, D	Supplies power to the paper transfer bias roller and paper separation corona unit.	7-5	A1
PC8	High voltage supply board: T1, PCC	Supplies power to the transfer belt and pre-cleaning corona unit.	7-9	A2
PCB10	High voltage supply board: B	Supplies power to the development rollers.	5-9	A3
PCB7	High voltage supply board: C, G	Supplies power to the charge corona wire and grid.	7-1	A14
PCB19	Operation panel board	Used to operate the copier.	4-1	H19
PCB22	Polygon mirror motor drive board	Controls the polygon mirror motor.	1-13	O15
PCB14	Revolver motor drive board	Controls the revolver motor.	7-7	F5
PCB15	Interface board: CSS/Bank	Connects to the CSS unit and optional paper tray unit.	7-6	J9
PCB20	Duplex control board	Controls the duplex unit.	4-18	F20 (A259/A260 copiers only)
PCB23	Temperature and humidity sensor board	Detects the ambient temperature and humidity.	3-16	E19

Motors

Symbol	Name	Function	Index-No	Remarks
M1	Scanner motor	Drives the scanner.	1-2	M6
M2	Polygon mirror motor	Drives the polygon mirror (laser unit).	1-14	O15
M11	Fusing motor	Drives the transport and fusing units.	6-5	E8
M7	Paper feed motor	Drives the paper feed unit.	3-2	A12
M8	Tray lift motor	Lifts the tray bottom plate.	6-8	A12 (A258 models only)
M10	Drum motor	Drives the drum, the development unit currently at the development position, and the transfer belt.	6-9	A19
M9	Toner supply motor	Supplies toner.	6-2	A7
M3	Revolver drive motor	Rotates the revolver unit.	6-3	G5
M5	Duplex Side fence jogger motor	Drives the duplex unit side fences.	4-16	G21 (A259/A260 copiers only)
M6	Duplex End fence jogger motor	Drives the duplex unit end fences.	4-17	G21 (A259/A260 copiers only)
M4	Duplex feed motor	Drives the paper feed roller in the duplex unit.	4-14	G20 (A259/A260 copiers only)

Fan Motors

Symbol	Name	Function	Index-No	Remarks
FM4	Scanner exhaust fan	Cools the scanner unit.	1-7	P7
FM2	Optics cooling fan	Cools the scanner unit	1-20	O14
FM3	Charge corona fan	Cools the charge corona unit.	5-5	A6
FM6	Main exhaust fan	Sucks air from the charge and transfer areas out of the machine.	7-10	A17
FM1	Transport fan	Attracts copy paper to the transport belt.	2-11	A11
FM5	Fusing unit fan	Cools the fusing unit.	7-3	E1
FM7	Rear cooling unit fan	Cools the rear section of the copier.	7-2	E10
FM8	PSU fan	Cools the PSU.	7-12	A7

Sensors

Symbol	Name	Function	Index-No	Remarks
S21	Platen cover position sensor	Detects if the platen cover is opened or closed.	1-3	O7
S23	Scanner H.P. sensor	Detects the scanner home position.	1-21	P14
S20	Original length sensor	Detects the length of the original.	1-5	N7
S24	Original width sensor	Detects the width of the original.	1-18	P14
S16	Transfer belt H.P. sensor	Detects the mark on the transfer belt.	2-4	A18
S18	Paper exit sensor	Detects paper jams at the paper exit.	4-5	F1
S2	Toner cartridge sensor	Detects the presence or absence of toner cartridges.	5-6	A4
S1	Toner end sensor	Detects the presence or absence of toner in a cartridge.	5-8	A4
S4	Potential sensor	Detects the potential of the drum surface.	5-10	A5
S5	ID sensor	Detects the density of toner on the developed ID sensor patch on the drum.	5-4	A5
S3	Revolver H.P. sensor	Detects if the revolver is at the home position.	5-7	A4
S17	Registration H.P. sensor	Detects paper jams at the registration section.	3-15	A19
S9	Relay sensor	Detects paper jams at the relay section.	3-12	A13 (A258 models only)
S12	Used toner sensor	Detects if the used toner tank is full	7-8	A15
S6	Belt cleaning H.P. sensor	Detects if the belt cleaning unit is at the home position.	2-2	A8
S13	Paper transfer H.P. sensor	Detects if the paper transfer unit is at the home position.	2-8	A15
S7	By-pass feed paper end sensor	Detects if there is paper on the by-pass feed table.	3-13	A8
S8	Upper limit sensor	Detects the upper limit position of the tray bottom plate.	3-10	A13 (A258 models only)
S15	Paper height sensor 2	Detects the amount of paper in the tray.	2-7	A16 (A258 models only)
S14	Paper height sensor 1	Detects the amount of paper in the tray.	2-6	A16 (A258 models only)
S10	Tray paper end sensor	Detects if there is paper in the paper feed tray.	3-11	G13 (A258 models only)
S25	Side fence jogger HP sensor	Detects the home position of the duplex unit side fence.	4-15	G22 (A259/A260 models only)
S26	End fence jogger HP sensor	Detects the home position of the duplex unit end fence.	4-19	G22 (A259/A260 models only)
S27	Duplex paper end sensor	Detects if there is paper in the duplex unit.	4-13	G22 (A259/A260 models only)

Symbol	Name	Function	Index-No	Remarks
S28	Duplex entrance sensor	Detects when copy paper comes into the duplex unit.	4-11	G23 (A259/A260 models only)
S29	Duplex turn sensor	Detects when copy paper is being reversed in the duplex unit.	4-12	G23 (A259/A260 models only)
S19	Oil end sensor	Detects if there is silicone oil in that tank.	4-6	G1
S22	Original length sensor-sub	Detects the length of the original	1-23	P7
S11	Relay Sensor	Detects a paper jam at the relay section	3-12	A14 (A259/A260 models only)

Switches

Symbols	Name	Function	Index-No	Remarks
SW1	Main power switch	Turns the power to the copier on or off.	2-1	M1
SW2	Front door switch	Cuts the DC line to the high voltage supply board when the front door is open.	2-12	E11
SW3	Paper exit door switch	Detects if the paper exit door is open or closed.	2-13	A7 (A259/A260 models only)
SW4	By-pass feed table switch	Detects if the by-pass feed table is open or closed.	3-14	A8
SW5	Paper tray detector switch	Detects the presence or absence of a paper tray.	2-3	A16 (A258 models only)
SW6	Vertical transport switch	Detects if the vertical transport door is open or closed.	3-8	A17

Clutches

Symbols	Name	Function	Index-No	Remarks
CL1	By-pass feed clutch	Transmits drive to the by-pass feed mechanism.	3-5	A9
CL3	Registration clutch	Transmits drive to the registration rollers.	3-3	A18
CL6	Relay clutch	Transmits drive to the relay rollers.	3-4	A18
CL2	Paper feed clutch	Transmits drive to the paper feed mechanism.	3-6	A17
CL8	Fusing clutch	Transmits drive to the fusing unit.	6-6	E1
CL9	Belt lubricant clutch	Transmits drive to the belt lubricant mechanism.	6-4	E2
CL7	Belt cleaning clutch	Transmits drive to the belt cleaning unit.	6-7	E2
CL5	Development clutch	Transmits drive to the development mechanism.	6-1	E3
CL4	Paper transfer positioning clutch	Transmits drive to the paper transfer unit.	3-1	A11

Solenoids

Symbols	Name	Function	Index-No	Remarks
SOL1	By-pass pickup solenoid	Lowers the by-pass pick-up roller.	3-9	A9
SOL2	Junction gate solenoid	Raises the junction gate for the duplex tray.	2-14	A7 (A259/A260 copiers only)

Lamps

Symbol	Name	Function	Index-No	Remarks
L1	Hot roller fusing lamp	Provides heat to the hot roller.	4-7	H1
L2	Pressure roller fusing lamp	Provides heat to the pressure roller.	4-4	G1
L3	Exposure lamp	Applies high intensity light to the original for exposure.	1-19	O5
L4	Quenching lamp	Neutralizes any charge remaining on the photoconductor.	5-2	A6

Heaters

Symbol	Name	Function	Index-No	Remarks
H3	Optics anti-condensation heater	Prevents moisture from forming on the optics.	1-17	L1
H1	Paper transfer unit heater	Prevents moisture from forming around the paper transfer unit.	2-9	J1
H2	Transfer belt heater	Used to stabilize the temperature around the transfer belt.	2-5	K1

Thermistors

Symbol	Name	Function	Index-No	Remarks
TH2	Hot roller thermistor	Controls the temperature of the hot roller.	4-6	G1
TH1	Pressure roller thermistor	Controls the temperature of the pressure roller.	4-9	F1

Thermofuses

Symbol	Name	Function	Index-No	Remarks
TF1	Hot roller thermofuse	Protects the hot roller from overheating.	4-8	H1
TF2	Pressure roller thermofuse	Protects the pressure roller from overheating.	4-3	H1

Thermostat

Symbol	Name	Function	Index-No	Remarks
TS1	Thermostat	Prevents the exposure lamp from overheating when it is on for a long time.	1-22	O6

Counter

Symbol	Name	Function	Index-No	Remarks
CO1	Upper mechanical counter	Indicates the total number of development cycles made using the C, M, and Y development units;	2-10	A9
CO2	Lower mechanical counter	Shows the total number of black developments.	2-10	A10

2. DETAILED DESCRIPTIONS

2.1 PROCESS CONTROL

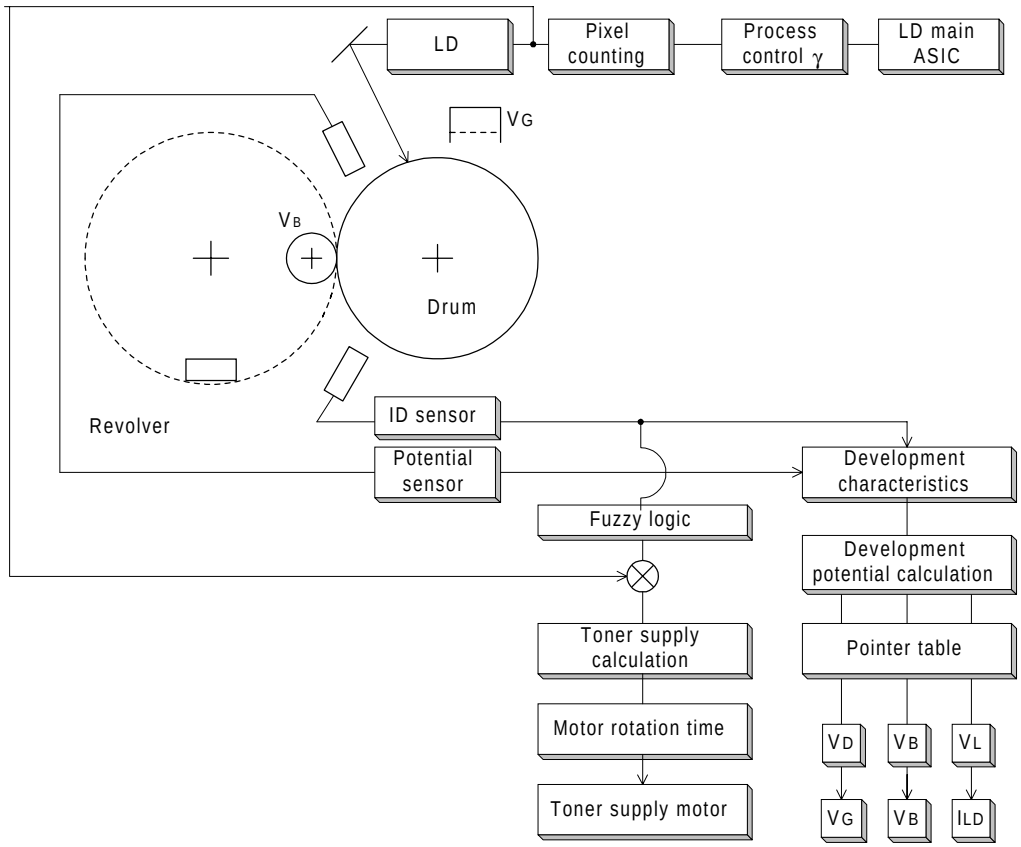
2.1.1 OVERVIEW

This copier provides the following forms of process control:

- Potential control (done every process control self check)
- Process control gamma calibration (done every process control self check, after potential control)
- Toner supply control (done every copy)

The components used for process control are:

- Potential sensor (a new type of sensor is used, known as a 'feedback measurement potential sensor'). This sensor detects the surface potential of the drum.
- ID sensor (a new type of sensor is used, known as a 'diffused reflection ID sensor'). The ID sensor detects the amount of toner on the drum.



A259A001.WMF

2.1.2 POTENTIAL CONTROL

Overview

Potential control is the process of controlling the development potential to maintain the density of the toner image on the drum. It does this by compensating for variations in drum chargeability and toner chargeability.

The machine uses the image density (ID) sensor to measure drum reflectivity and the density of a standard sensor pattern. It uses the potential sensor to detect the potential on the standard sensor pattern (before the pattern is developed). These tests are done during the process control self check, which is done at specific times (such as after replacing the developer).

The ID and potential sensor outputs are used to calculate the development potential. This is the difference between the development bias voltage and the voltage of areas of the drum that have been discharged by laser exposure at full power. If changes in this potential are not accounted for, the color balance will be poor.

Depending on the development potential that is calculated, the machine uses a look-up table in memory (called a pointer table) to adjust the following:

- V_D: Drum potential without exposure - to adjust this, the machine adjusts the charge corona grid voltage (V_G)
- V_L: Drum potential with the strongest exposure - to adjust this, the machine adjusts the laser diode input current (I_{LD})
- V_B: Development bias

Potential control controls the development potential so that the maximum amount of toner applied to the drum is kept constant. However, the medium (greyscale) range is ignored. To improve this situation, a new process called ‘process control gamma correction’ is done after potential control. This process defines LD output for all 256 grades of the greyscale (development bias and charge corona grid potential are not affected).

Potential Control Timing

The machine carries out potential control and process control gamma correction during the ‘process control self check’. There are five types of process control self check, categorized according to their execution times. Process control takes approximately 3 minutes.

(1) Forced process control

After replacing the drum, the technician must do the forced process control procedure (SP3-126). There is no need to use SP3-126 at installation, because forced process control is included in the developer initialization process (SP2-225). (See 6.6.3 Developer Collection Procedure for details.)

(2) Initial process control self check

The initial process control starts automatically when the power is turned on (or when the machine returns to standby mode from sleep mode), but only if the hot roller in the fusing unit is less than 100 degrees centigrade. This process control is done only when SP3-125 (Set Potential Control Method) is set to "0 (Auto)."

(3) Interval process control self check

The interval process control starts automatically at the end of a copy job during which the total number of copies exceeds a preset value.

The preset value can be defined using SP3-973 (Set Process Control Self Check Interval). The factory setting is 150 sheets. The maximum possible interval is 500 sheets. Using a shorter interval reduces the machine's average copying speed. Setting the process control interval to 0 disables the interval process control.

(4) Timed process control self check

The timer is reset to 6 hours after a process control self check, at the end of a copy job, when the power is switched on, after toner end recovery, or if the front door is opened and closed.

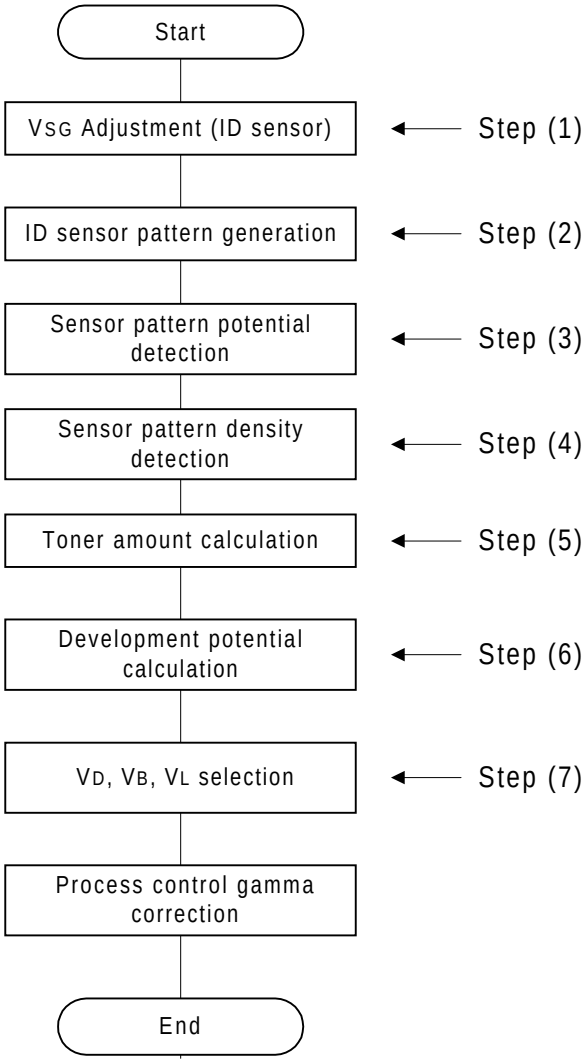
The 6-hour interval can be adjusted with SP 3-972.

(5) ACC-Run-Time Process Control Self Check

A process control self check that is active before the execution of ACC (auto color calibration). The checks is identical to the interval process control self check.

2.1.3 PROCESS CONTROL SELF CHECK

Flow Chart



A259A002.WMF

Step 1: V_{SG} Adjustment

The type of ID sensor used in this machine responds differently for black and color, so there are two V_{SG} values, one for black toner and one for CMY toner.

The type of ID sensor used in this machine is very sensitive, and outputs some voltage even if there is no light being reflected off the drum. This output is known as the 'offset'. It is about 1 V for black and about 0.2 V for color, but is different for each sensor. For more details on this sensor (known as a 'diffused reflection ID sensor'), see 'Step 4: Sensor Pattern Density Detection'.

The ID sensor checks the bare drum's reflectivity and the machine calibrates the output of the ID sensor as follows. This voltage is known as V_{SG}:

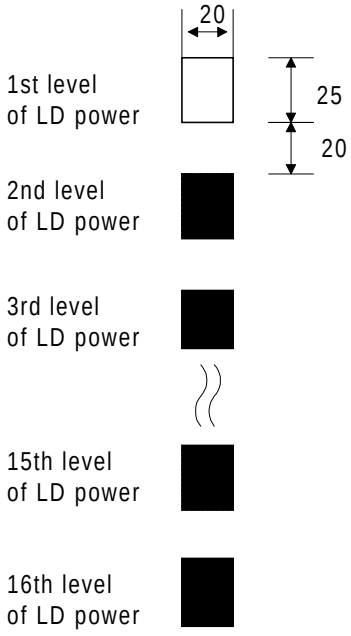
- Black: (1.8 + offset) ± 0.1V
- Color: Must be between 0.2 and 3 V

This calibration compensates for the drum's condition (due to ageing) and the ID sensor condition, such as dirt on the surface of the drum or ID sensor.

Note that V_{SG} for black is less than half that in previous models. This is due to the new type of ID sensor.

Step 2: ID Sensor Pattern Generation

The machine makes a 16-grade pattern on the drum for each toner color. Each grade is made by changing the LD power. At this stage, the patterns are not developed; they remain as latent images.



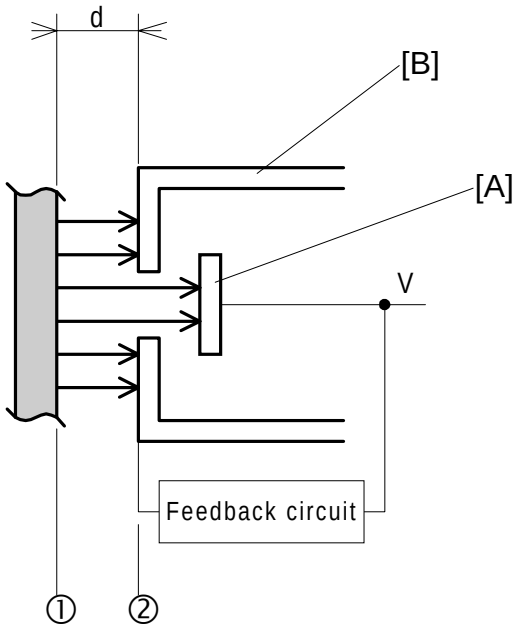
A259A004.WMF

Step 3: Sensor Pattern Potential Detection

Process

The potential sensor detects the potential on each grade of the 16-grade sensor pattern latent image, for each colour, and the output is stored in memory.

Feedback Type Potential Sensor



A259A003.WMF

This copier uses a feedback potential sensor. A description of the principles of feedback potential sensors follows.

The detector [A] detects the strength of electric fields emitted from the drum surface, which depend on the surface potential of the drum. The feedback circuit applies voltage to the probe [B] until the electric field strength is offset at the detector. The level of this voltage determines the magnitude of the surface potential on the drum surface and is presented as output.

The major features of this measurement method are:

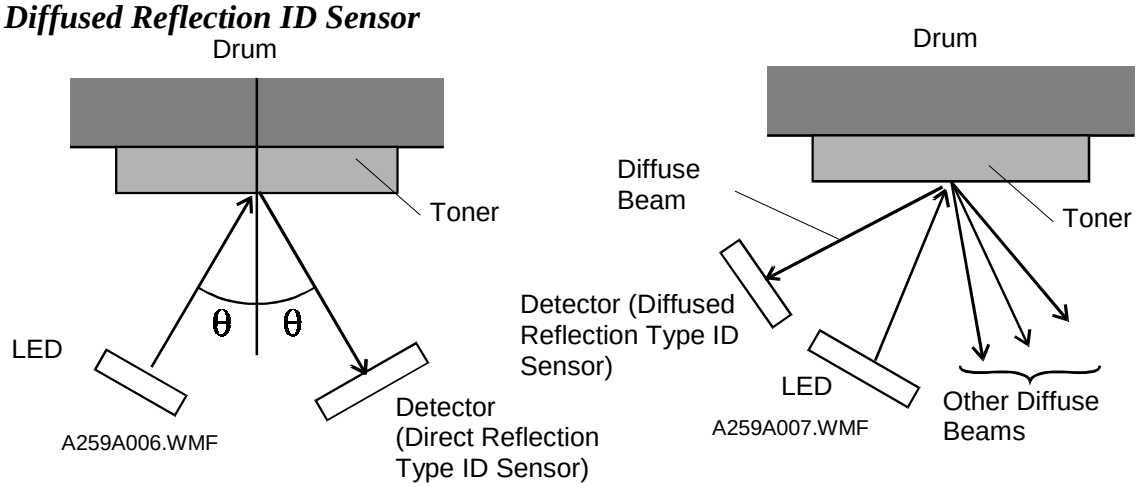
- Even if the distance [d] between the drum (1) and the potential sensor (2) fluctuates, the measurement of the drum surface potential is still accurate.
- The potential sensor does not have to be calibrated before the process control self check, so the calibration step required for previous models can be skipped.
- Residual potential affected the calibration for the older type of sensor, so before process control self checks, the machine had to wait 10 minutes in standby mode for the residual voltage to disappear. For this new sensor, calibration is not needed, so the influence of residual potential on the drum can be ignored.

Step 4: Sensor Pattern Density Detection

Process

The development rollers of the respective colors develop the sensor pattern latent images for K, Y, C, and M generated in Step (2). In Step (4), the ID sensor detects the densities of the 16 patch patterns for each color. This data goes to memory.

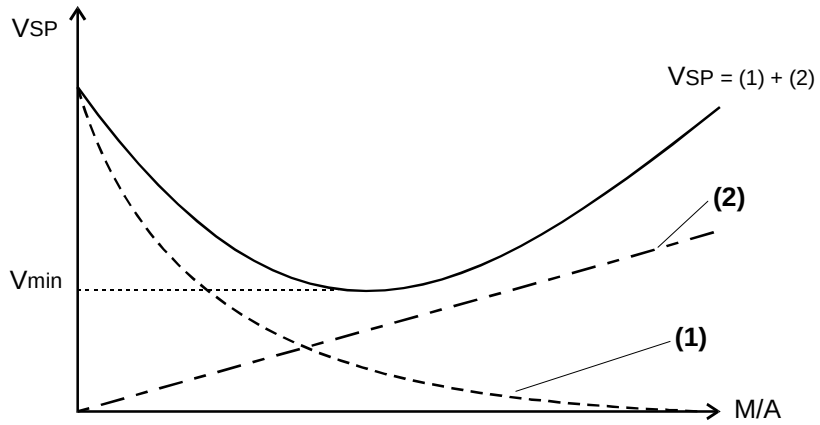
Diffused Reflection ID Sensor



This copier uses a diffused reflection ID sensor. In addition to the ray directly reflected from the drum, there are diffuse beams reflected at all angles from the toner on the drum. This sensor detects image density by receiving some of these diffuse beams, not by receiving the beam directly reflected from the toner.

Using this type of sensor improves the measurement accuracy of the sensor pattern densities particularly for Y, C, and M toners. The following explains why.

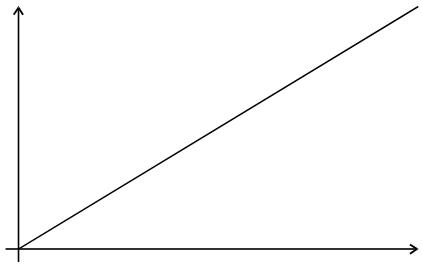
Color (Y, C, M) toners



(1): Component of light reflected from the drum

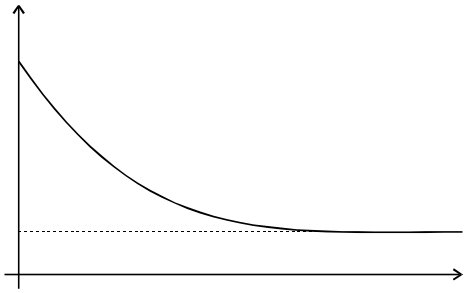
(2): Component of light reflected from C, M, or Y toner

Figure A Relationship between the output of the normal reflection type ID sensor and the amount of toner on the drum for C, M, and Y toners



A259A009.WMF

Figure B Relationship between the output of the diffused reflection ID sensor and the amount of toner on the drum for C, M, and Y toners



A259A010.WMF

Figure C Relationship between the output of the diffused reflection ID sensor and the amount of toner on the drum for K toner

Figure A shows the relationship between the output of the normal reflection ID sensor and the amount of Y, C, or M toner attached to the drum. This shows that the ID sensor output (Vsp) results from not only the light reflected from the toner but also the component of light reflected from the drum.

With this old sensor type, the machine was unable to accurately detect high values of M/A for colored toner (i.e., to the right of the minimum in the VSP curve at Vmin.

The diffused reflection ID sensor, on the other hand, picks up little light that is reflected from the drum. So, the relationship between the diffused reflection ID sensor output and the amount of toner on the drum is linear, as shown in Figure B. This means that high densities of colored toner can be measured accurately.

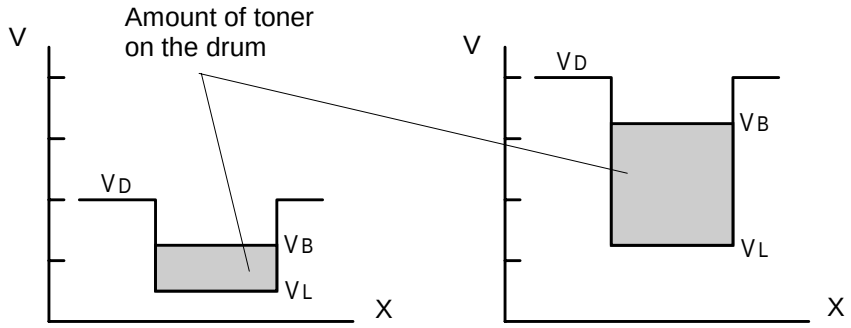
K toner

The ID sensor output for K toner tends to decrease as the density of toner on the drum increases. Therefore, the relationship between the ID sensor output and the amount of K toner on the drum is as shown in Figure C.

Step 5: Toner Amount Calculation

The amount of toner on the drum (M/A, mass per unit area, mg/cm^2) is calculated for each of the 16 grades of the sensor pattern from the ID sensor output value (Vsp) from each grade of the pattern.

Step 6: Development Potential Calculation



When the development potential is smaller A259A011.WMF **When the development potential is larger**

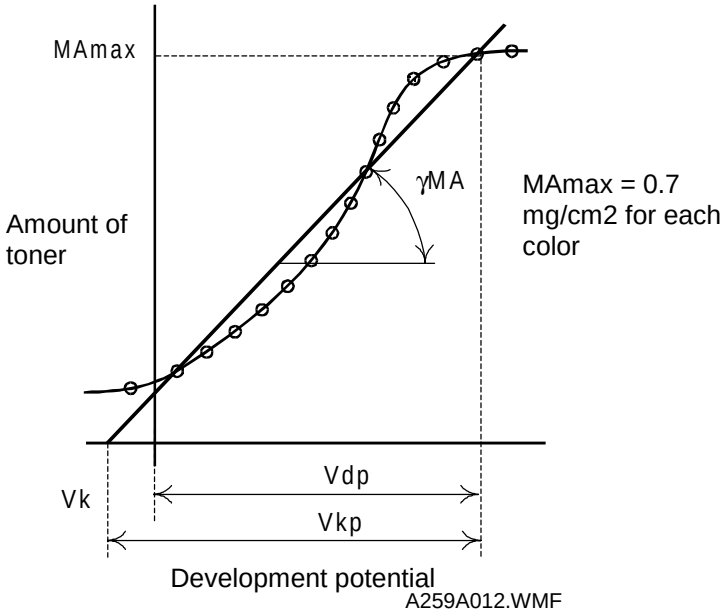
The development potential (V_{DP}) is the capability to attract toner to the drum and can be shown as: V_B - V_L

- V_B: Development bias
- V_L: Drum potential after full laser exposure

See the above drawing for two examples.

The machine calculates the approximate current development potential from the sensor readings. This consists of the following steps:

1. The machine converts the gradation pattern densities (from the ID sensor) into an actual toner amount on the drum (M/A) for each grade of the pattern.
2. From the potential and ID sensor outputs, the machine then determines the relationship between the drum potential and the amount of toner developed on the drum. This is known as the development gamma factor, or γMA.
3. The machine can now calculate the development potential (V_{DP}) that would be required to obtain the ideal toner density (known as M/A max) on an area of the drum developed with full laser power, under the machine's present conditions.



A259A012.WMF

NOTE: For Y, C, and M toners, the new type of ID sensor allows higher densities of toner to be measured accurately (refer to the descriptions in Step 4, Sensor Pattern Density Detection). This permits the calculation of γ M/A at a higher accuracy than a normal reflection ID sensor, because the measurements at higher densities (M/A values) are more reliable.

Step 7: Selecting the Optimum V_D, V_B, V_L

The machine now adjusts V_D, V_B, and V_L to try to bring the development potential V_{DP} to the ideal value. To do this, it uses a pointer table. This is a look-up table in ROM of V_{DP} against V_D, V_B, and V_L.

The machine takes the value of V_{DP} calculated in the previous section, and looks for the value of V_{DP} in the pointer table that is closest to this. The machine reads the values of V_D, V_B, and V_L that are in this row of the pointer table.

The machine will then use these values of V_D, V_B, and V_L during copying until the next process control self check. These values are designed to bring the actual V_{DP} to the optimum value for the machine's current condition.

- V_D: Drum potential without exposure - to adjust this, the machine adjusts the charge corona grid voltage (V_G)
- V_L: Drum potential with the strongest exposure - to adjust this, the machine adjusts the laser diode input current (I_{LD})

V_B: Development bias

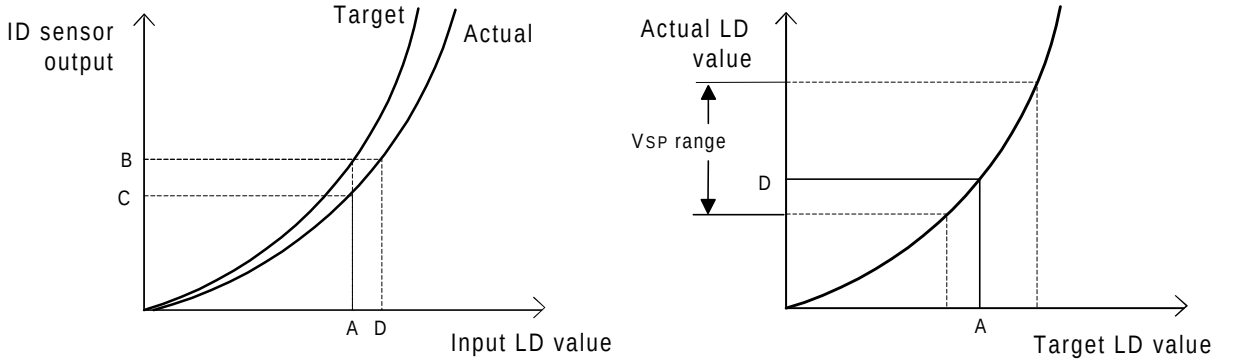
2.1.4 PROCESS CONTROL γ CORRECTION

What is process control γ?

After process control, the proper values for V_D, V_B, V_L have been defined for the maximum laser power. However, the medium (greyscale) range is ignored. To improve this situation, a new process called 'process control gamma correction' is done after potential control. This process defines a suitable LD output for all 256 grades of the greyscale.

Process control gamma correction takes about 30 seconds.

How is it done?



A259D556.WMF

Based on the maximum laser power just defined during the process control self check, the machine writes another 16-grade sensor pattern on the drum.

NOTE: This is different from the sensor pattern made during potential control – that pattern always uses 16 fixed laser power levels.

The ID sensor detects the density developed on these patterns and compares them with the target densities in ROM. The target densities and the actual densities can be plotted as shown in the diagram above left.

NOTE: To make the curve of actual densities, the machine draws a curve through the density points read from the 16-grade pattern made for process control gamma.

From this, the machine determines how much to correct the LD power when attempting to write a certain density on the drum.

In the example in the diagram, for a laser power of A, the machine expected an ID of B. However, the actual result was C. To get an ID of B, the machine has to use a laser power of D. The expected ID can be plotted against the actual ID as shown in the diagram above right; this is the process control gamma curve.

Process control γ target values are stored in the NV-RAM on the main control board. The CPU calculates the process control γ on this board. The results of the process control γ calculation go to the LD main control board to compensate the LD input data.

The process control gamma obtained cannot be adjusted in SP mode.

Process control gamma correction timing

The machine automatically does process control gamma correction at the end of every process control self check.

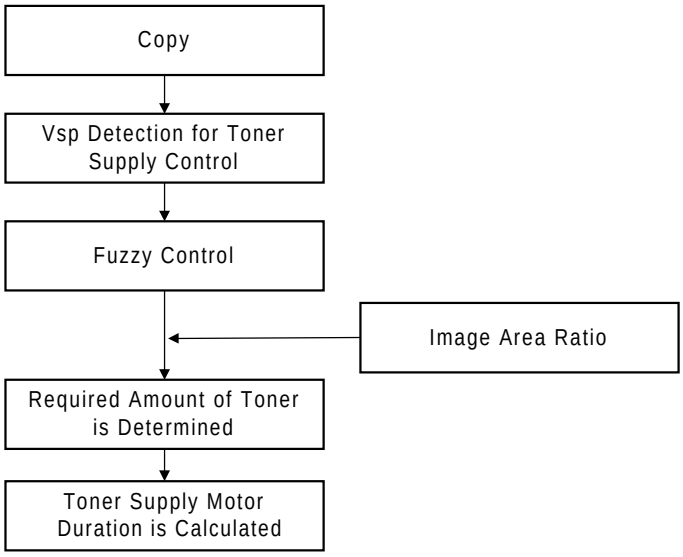
2.2 TONER SUPPLY CONTROL

2.2.1 TONER SUPPLY CONTROL METHOD

This machine has two toner supply control methods: fuzzy control mode, and fixed supply mode.

Normally this machine uses fuzzy control. The fixed supply method is used only when abnormal conditions occur during the process control self check.

2.2.2 FUZZY CONTROL MODE


Copy
Vsp Detection for Toner Supply Control
Fuzzy Control
Image Area Ratio
Required Amount of Toner is Determined
Toner Supply Motor Duration is Calculated

A259D668.WMF

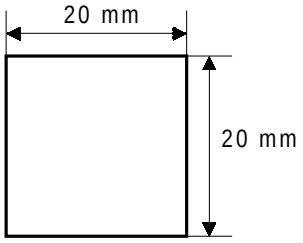
First, the machine assesses the amount of toner per unit area on the drum (M/A). This is determined from two sensor inputs: Vsg, and Vsp(toner).

The fuzzy logic algorithm then uses the most recent M/A values to assess current toner density conditions.

The output from the fuzzy logic process is then combined with the image area ratio obtained from the image data signal coming from the IPU board. The result of this calculation is the amount of toner required, and from this, the machine determines the time that the toner supply motor must stay on in order to supply the correct amount of toner.

2.2.3 VSP DETECTION FOR TONER SUPPLY CONTROL

The copier generates an ID sensor pattern using a standard laser diode power. The copier generates this pattern between the K, C, M, and Y images, and then detects the density using the ID sensor. The result is known as 'VSP for toner supply control', or 'VSP (toner)' to distinguish it from the other VSP, measured during potential control.

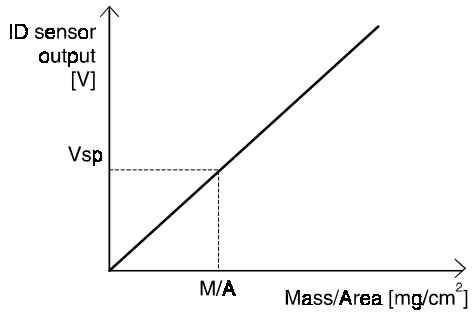


A259A015.WMF

This process is done after

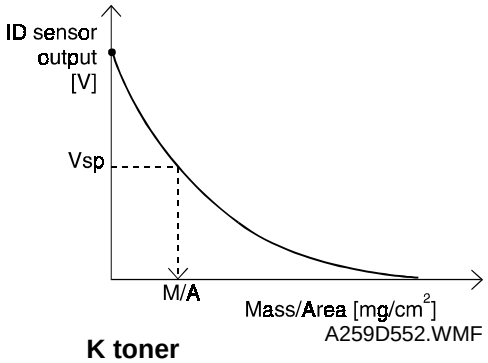
- Each color development cycle for odd-numbered copies when making continuous copies of A4/LT landscape size or smaller.
- Each color development cycle, every copy in all other modes.

2.2.4 CALCULATING THE AMOUNT OF TONER ON THE DRUM



A259A009.WMF

Y, M, C toner



A259D552.WMF

K toner

First, the machine calculates a value from the current VSP (toner) value. Then, it refers to a table in the ROM to determine the toner density on the drum (M/A).

- M/A: Toner amount per unit area on the drum (mg/cm^2)

The target M/A for toner supply control is 0.4 mg/cm2 for the C, M, and Y toners and 0.3 mg/cm^2 for the K toner. M/A is calculated in the same way as for potential control.

Fuzzy Logic Algorithm

The fuzzy logic algorithm has two input factors which are related to the amount of toner on the drum. These are:

- The difference between the average of the previous 10 M/As and the target M/A
- The tendency of the previous 10 M/As

Image Area Ratio

This is a measure of how much toner will be needed for each color on a page. From the image data from the image processing unit (IPU), the machine determines the total amount of the color on the page. It takes into account the grayscale values for each pixel for that color.

2.2.5 FIXED SUPPLY MODE

In fixed supply mode, the machine adds a fixed amount of toner to the developer every copy. Readings from the ID sensor are ignored.

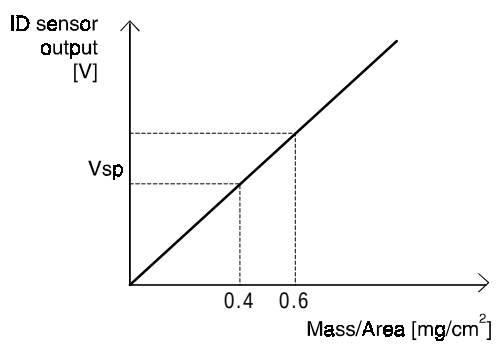
SP 2-208-005 to 008 define the toner supply ratios for each color in fixed supply mode.

2.2.6 TONER SUPPLY IN ABNORMAL SENSOR CONDITIONS

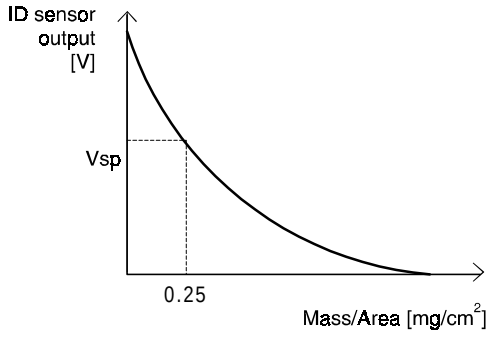
The machine detects that the ID sensor is abnormal if the detected V_{SG} value is out of the required range three consecutive times during process control. After that SC 385 is displayed and logged. Switching the main switch off/on recovers the machine and the toner supply method falls back to fixed supply mode.

If the abnormal condition is recovered during the next process control, the machine automatically selects the fuzzy control mode again.

2.2.7 DETECTING TONER NEAR END/END



YMC Toner A259D554.WMF



A259D555.WMF **K Toner**

Toner Near-end

For the Y, C, and M toners, the copier first detects toner near-end using the toner end sensor (see 'Development – Toner End Detection'). The toner end sensor detects the toner end condition during development. Then, V_{SP} is checked. If both toner end sensor and V_{SP} indicate near-end, the machine indicates a near-end condition for that color.

For K toner, the copier detects the toner near end condition using the ID sensor only. Light cannot pass through K toner as well as C, M, or Y. So toner adhering to the window inside the toner hopper blocks the light returning to the sensor. Therefore the copier cannot accurately detect how much K toner remains using the toner end sensor.

Toner End

After a toner near-end condition is generated, the copier uses the write mode pixel counter and sheet counter to detect toner end. This is done in the same way for all colors (K, C, M, and Y).

Toner near end detection

Toner end sensor

The toner end sensor detects light reflected from a mirror inside the toner hopper (see 'Development – Toner End Detection'). There are two levels of output, namely High (5V: no reflection/toner present) and Low (0V: reflection detected/no toner).

For C, M, and Y toners, the toner near end detection routine using V_{SP} begins when the toner end sensor detects four consecutive low signals.

This sensor does not work for K toner because toner adhering to the window blocks reflection back to the sensor. For K toner, only V_{SP} is used.

Toner near end detection routine using V_{SP}

Toner near end is displayed on the operation panel when the amount of toner (M/A) calculated during toner supply control is less than the target supply (0.4 mg/cm^2 for C, M, and Y; 0.25 mg/cm^2 for K) five times in succession.

Toner end detection

When a color reaches the toner near-end condition, 10 more pages can be made with that color.

Then, if during those 10 pages, the pixel count for the color in question reached 500%, the copier displays toner end for that color and that color cannot be used. (100% is defined as one A4 image with the color in question covering the whole page at full strength.)

If the pixel count has not yet reached 500% after 10 pages, copying can continue until the pixel count reaches 500%. Then, the copier displays toner end for that color and that color cannot be used.

If the pixel count reaches 500% during the first 10 pages, copying is not stopped, but that color toner may appear pale on the output.

This process is the same for the K, C, M, and Y toners.

Toner end recovery

The copier enters the recovery process in the following cases:

1. The front door is opened and a toner cartridge is removed or inserted.
   This is regarded as an ordinary replacement procedure for the toner cartridge.
   - When the door is opened, the copier moves the next-to-be-replaced color toner cartridge to the replacement position.
     ↓
   - Replace the toner cartridge.
     ↓
   - The copier enters the toner replenishment confirmation mode after the toner cartridge is replaced.

   NOTE: If recovery is needed for two colors, the copier proceeds with the next color if the door is opened or if the user specifies at the operation panel that the first color should be skipped.
2. If the copier is turned off and on, it assumes that toner cartridges for all colors have been replaced and enters the toner replenishment confirmation mode for all colors.

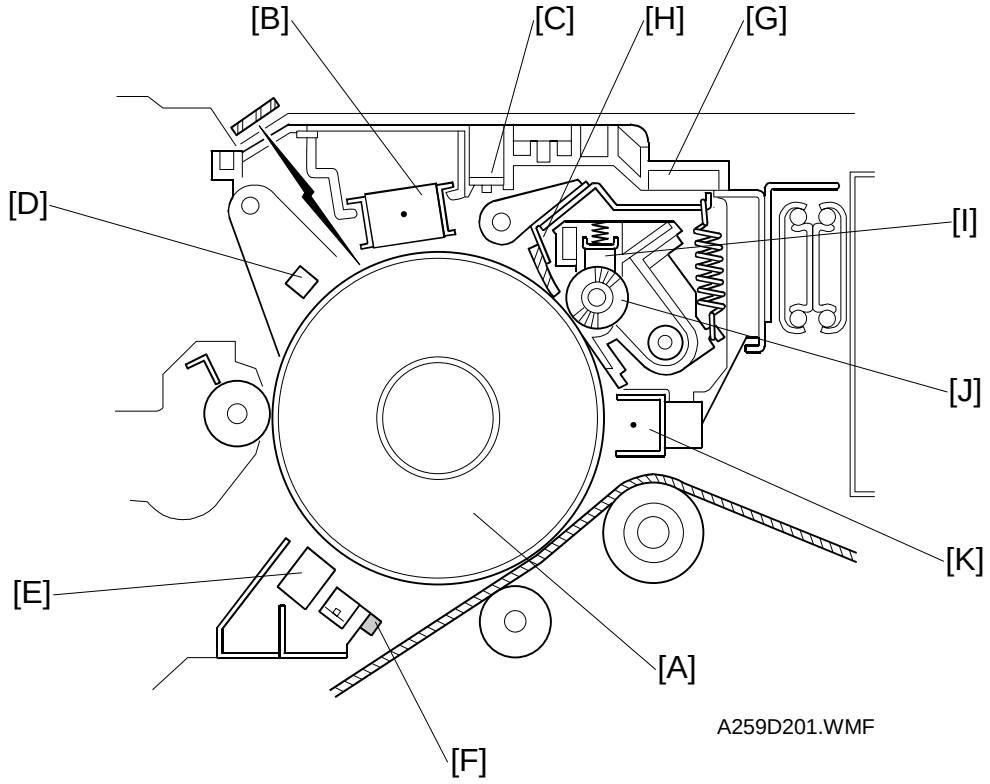
Toner replenishment confirmation mode

1. For color toners, the copier moves the toner cartridge of the first color to be subject to toner replenishment confirmation to the toner end sensor detection position (K, then Y, then C, then M). The copier does not use the toner end sensor for the K toner (it uses VSP). However, it moves the revolver to the toner end sensor when confirming toner replenishment for the K toner.
2. The copier rotates the toner cartridge for a certain period.
3. The machine checks whether toner is present. For the C, M, and Y toners, the copier uses the toner end sensor. For the K toner, the copier measures VSP.
4. The copier moves the toner cartridge for the next color to the toner end sensor detection position and performs steps 2) and 3).
5. When the toner replenishment confirmation cycle ends, the copier moves the toner cartridges to the detection position for the toner end sensor. The copier then checks again whether toner is present. If toner is found to be not present, the copier returns that cartridge to what it was before the toner recovery procedure started (toner near end or toner end).
6. The copier resets the toner near end and toner end states and resets the toner end related counters (pixel and sheet counters)for cartridges which the machine detects to be full.

Toner replenishment confirmation mode takes several seconds for the C, M, and Y toners and 20 to 30 seconds for the K toner.

2.3 DRUM UNIT

2.3.1 OVERVIEW



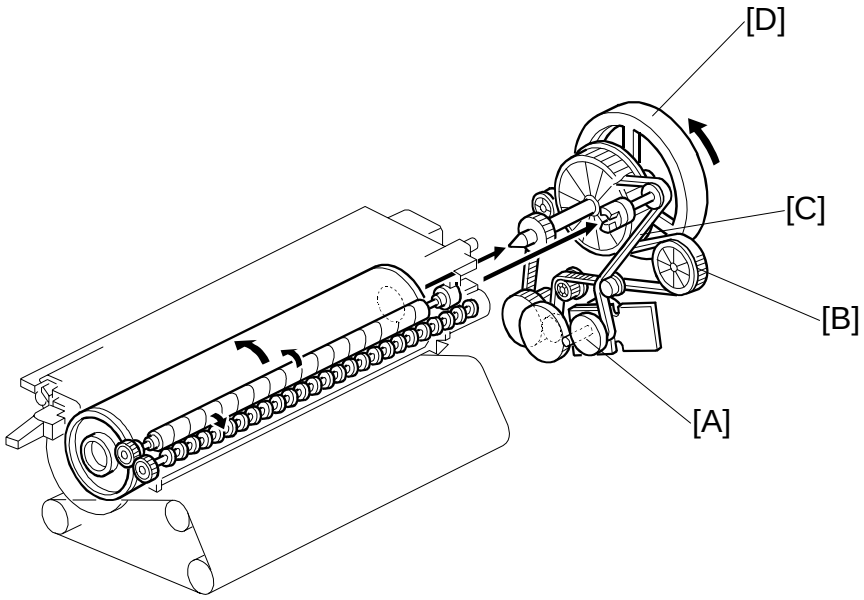
The drum unit is to the right of the drawer unit. It can easily be removed by pulling out the drawer unit.

The drum unit consists of the OPC drum [A], the charge corona unit [B], a quenching lamp [C], the drum potential sensor [D], the ID sensor [E], the carrier catcher [F], and a cleaning unit [G]. The cleaning unit is integrated in the drum unit to prevent toner from spilling out into the machine.

The cleaning unit is made up of the cleaning blade [H], the lubricant bar [I], the cleaning brush [J], and the pre-cleaning corona (PCC) [K].

The drum turns anticlockwise as viewed in this drawing.

2.3.2 DRIVE MECHANISM



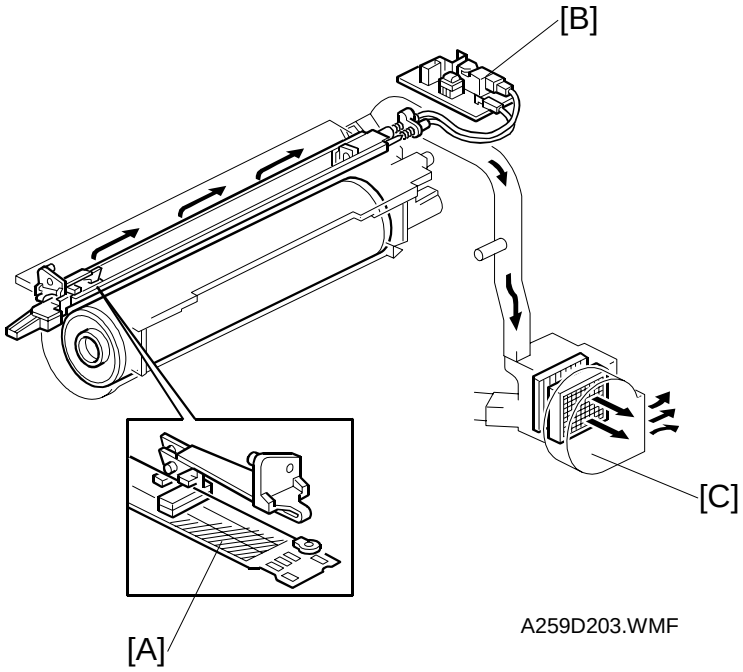
A259D202.WMF

The drum motor [A] (a brushless motor) drives the drum via gears and a timing belt. This motor also drives the cleaning unit using a timing belt [C].

This motor contains a drive controller circuit, which controls the drum rotation.

Since the drum shaft does not pass all the way through the drum from front to rear, a flywheel [D] is mounted on the shaft at the rear of the drum to eliminate uneven drum rotation.

2.3.3 DRUM CHARGE



This copier uses a single wire scorotron corona unit to charge the drum.

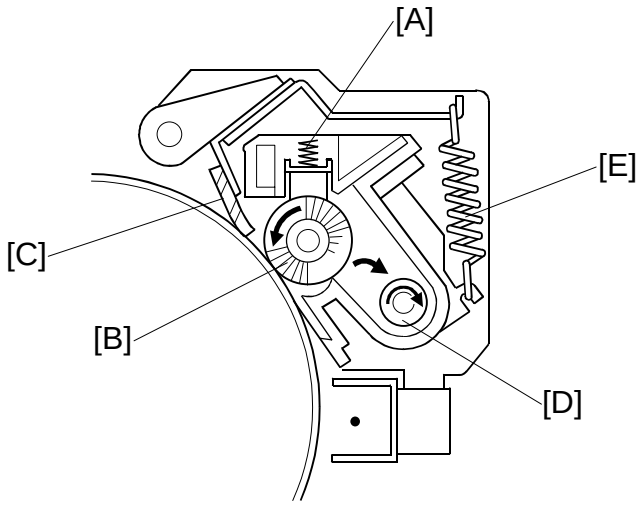
The single corona wire applies a negative charge to the drum surface (–670 V is the standard voltage). The stainless steel grid plate [A] makes the corona charge uniform.

The high voltage supply – C, G [B] supplies a constant voltage (–5 kV) to the corona wire, and controls the grid voltage.

The charge corona unit contains a cleaner. The wire and grid can be cleaned by sliding the charge corona unit forward and backward.

The main exhaust fan [C] at the rear of the copier causes air to flow through the charge corona unit from front to rear. This prevents uneven charging. The air also flows over the ID sensor, keeping it clean.

2.3.4 DRUM CLEANING

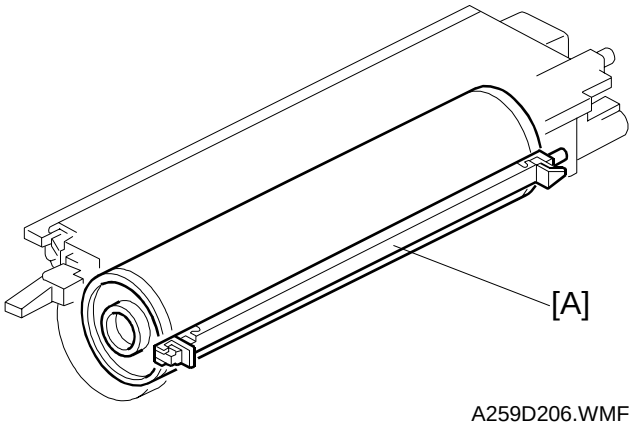


A259D204.WMF

Pressure is continuously applied to the lubricant bar above the cleaning brush by a spring [A]. The cleaning brush [B] spreads out the toner remaining on the drum, which makes it easier for the cleaning blade to remove. The brush collects toner from the drum surface and the cleaning blade [C] scrapes off the remaining toner on the drum. The toner falls onto the toner collection coil [D]. The toner collection coil transports the toner to the used toner tank.

The cleaning blade is angled against drum rotation for improved cleaning efficiency. The spring [E] maintains a constant downward pressure on the cleaning blade.

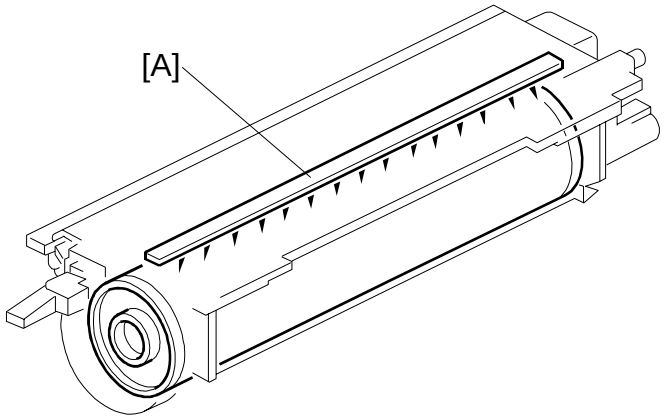
2.3.5 PCC



A259D206.WMF

The PCC [A] removes uneven charge on the drum, which means that it is not necessary to make one extra drum rotation before charging. This reduces the copy time for the first sheet of paper.

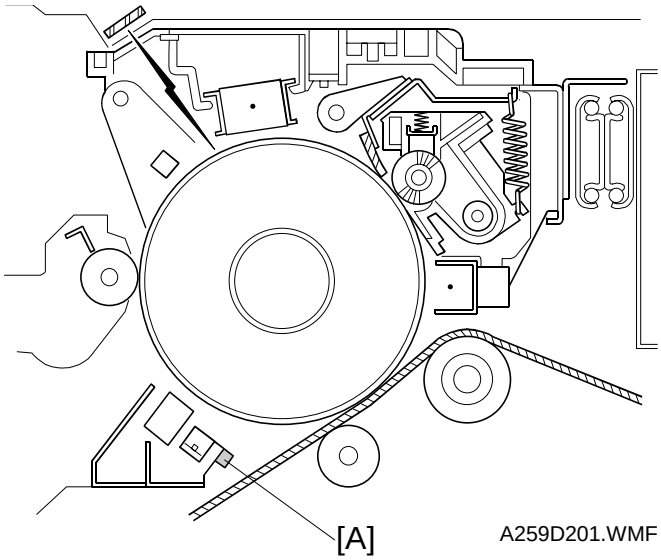
2.3.6 QUENCHING



A259D205.WMF

The quenching lamp [A] is a row of LEDs. It turns on immediately after the Start key is pressed and the drum motor starts. The light is red, to protect the drum from optical fatigue.

2.3.7 CARRIER CATCHER

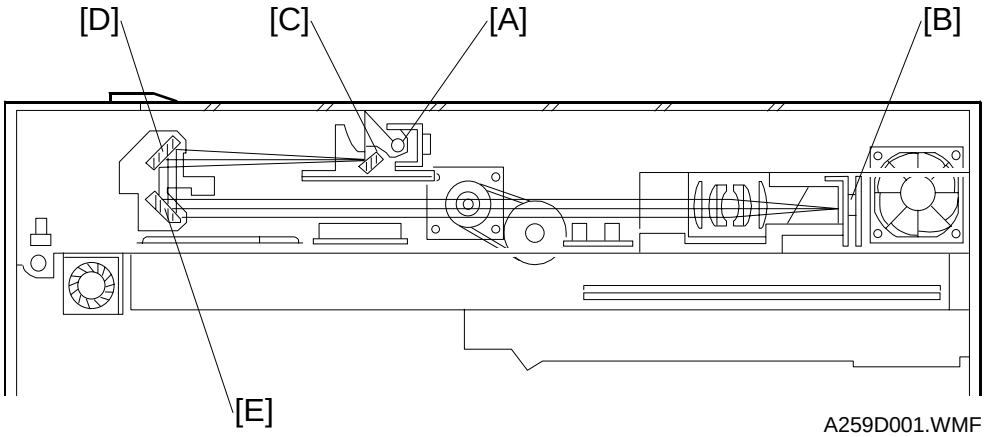


A259D201.WMF

There is a magnet [A] below the ID sensor. This removes weakly-magnetic worn carrier particles from the drum, preventing them from falling onto the copy paper and causing copy quality problems such as firefly spots.

2.4 SCANNER UNIT

2.4.1 OVERVIEW

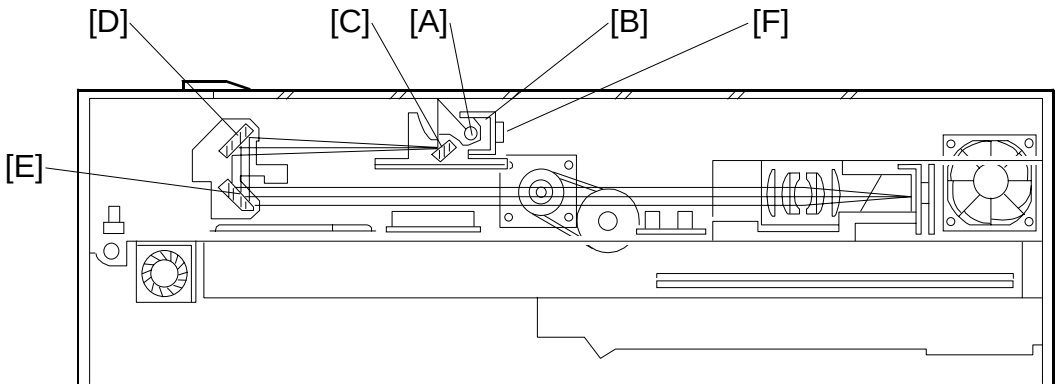


A259D001.WMF

An image of the original illuminated by the exposure lamp [A] (a halogen lamp) is reflected onto a color CCD [B] (Charge Coupled Device) via the 1st [C], 2nd [D], and 3rd [E] mirrors, filter, and lens. The filter removes infra-red from the light reflected off the original; this is particularly important for glossy photos with black areas, which can appear reddish in copies.

The number of scans depends on the copy mode (black, full color, auto color select, or single color). The scanner moves 4 times at most, once for each development cycle. The order of the cycles is black, yellow, cyan, and magenta. The CCD is a one-chip color CCD with an RGB color filter. The scanning resolution is 400 dpi (5,000 pixels).

2.4.2 SCANNER



A259D001.WMF

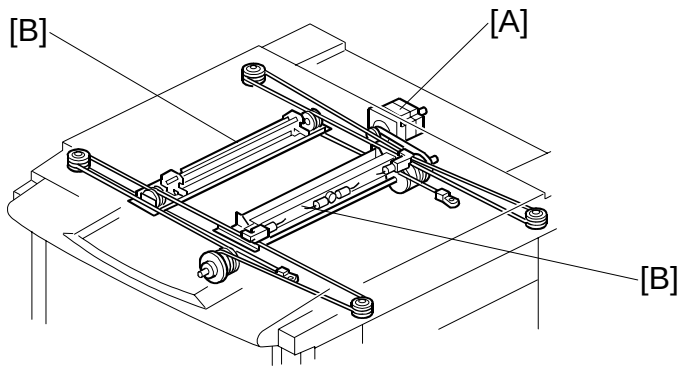
The 1st scanner consists of the exposure lamp [A], main and sub reflectors [B], and 1st mirror [C]. This model uses a halogen lamp with nine elements. The frosted surface of the exposure lamp ensures even exposure in the main scan direction.

The exposure lamp is energized by a dc supply to avoid uneven light intensity caused by power fluctuations while the 1st scanner moves in the sub-scan direction. The sub reflector is shaped so that light will expose the original evenly. This reduces shadows on pasted originals.

The 1st [C], 2nd [D], and 3rd [E] mirrors have glass on the reverse sides to increase their weight. This prevents the mirrors from vibrating.

The thermostat [F] in the 1st scanner protects against overheating. It will break at around 140 °C and cannot be reset.

2.4.3 SCANNER DRIVE



A259D002.WMF

A five-phase stepper motor [A] drives the scanner. This motor drives the 1st [B] and 2nd [C] scanners via two scanner wires. The wires at the front side and the rear side are the same, for easy assembly.

In full size mode, the 1st scanner speed is 156 mm/s during scanning, and 1638 mm/s when the scanner returns. The 2nd scanner speed is half that of the 1st scanner.

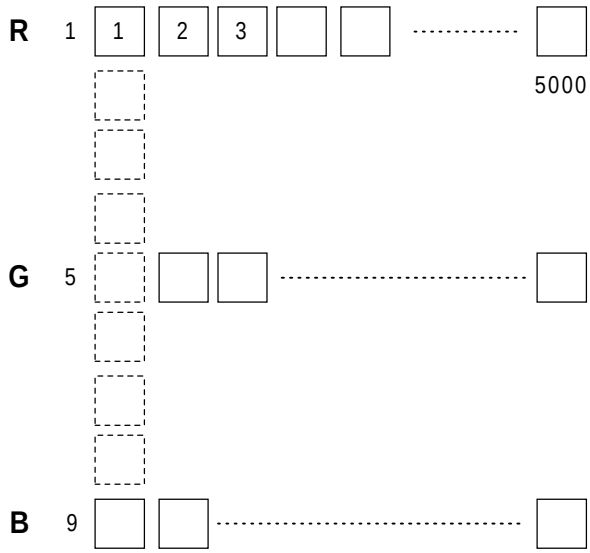
	Forwarding Speed	**Returning Speed**
Full Size Mode	156 (mm/s)	1638 (mm/s)
Reduction or Enlargement Mode	156/M (mm/s)	1638 (mm/s)

In reduction or enlargement mode, the scanning speed depends on the magnification ratio (M: 0.25 to 4.00) i.e., 156/M mm/s. The returning speed is always the same (1638 mm/s). The image length is changed in the sub-scan direction by changing the scanner speed, and in the main scan direction by image processing on the scanner IPU board.

The number of scans depends on the color selection mode as shown in the following table:

Mode		**Number of Scans**	**Development Order**
Black and White		1	K
Auto Color Selection	For Black and White Originals	1	K
	For Colored Originals	4	K → Y → C → M
Single Color	For Y, C, or M	1	Y, C, M
	For G, R, or B	2	Y → C, Y → M, C → M
Full Color		4	K → Y → C → M

2.4.4 COLOR CCD



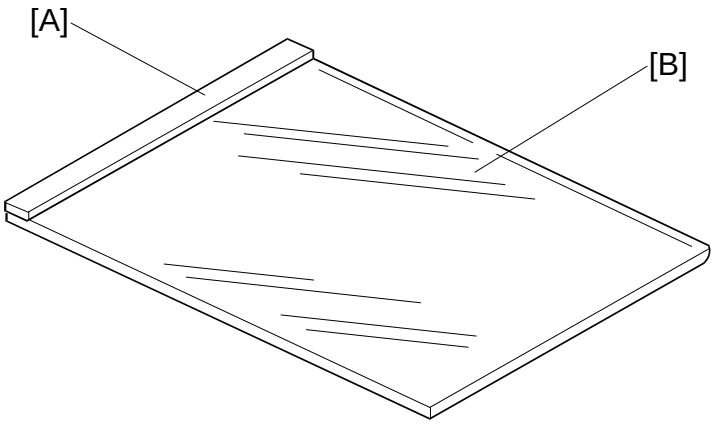
A259X001.WMF

The color CCD converts light reflected from the original into three analog signals, one for each of the three basic colors Red, Green, and Blue. The signals are called the R, G, and B signals. Each of the four scans (for toner colors YMCK) generates a separate set of three signals (RGB).

The CCD consists of three lines of 5000 elements at a resolution of 400 dpi (15.7 dots/mm). To make the R, G, and B signals, each line has a color separation filter (R, G, or B). The lines are spaced 4 pixels apart for full size magnification. To correct for the spacing, the R, G, and B signals must be synchronized. This is done by delaying the signals in memory buffers on the scanner IPU board (the Image Processing section contains more details).

The CCD is mounted on the board with the lens block (the assembly is known as the SBU (Sensor Board Unit). Therefore, to replace the CCD, replace the SBU.

2.4.5 WHITE PLATE SCANNING



A259D801.WMF

There is a white plate [A] for auto shading, stuck on the exposure glass [B] underneath the left scale. When this white plate is scanned, the output from all the CCD elements in a line should in theory be equal, but actually it is not, for the following reasons:

- Variations in sensitivity between elements of the CCD
- Variations in characteristics of lens and mirror reflectivity
- Loss of brightness toward the ends of the exposure lamp

To correct for this uneven output from the CCD elements, the light reflected from the white reference plate is scanned. This is known as auto shading.

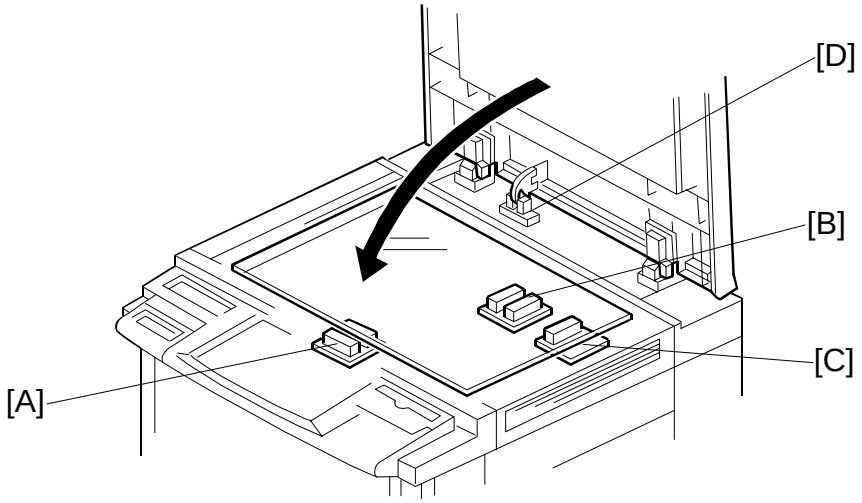
Auto shading is done every copy cycle at the scanner home position before starting the first scan.

2.4.6 SCANNER IPU BOARD

The scanner IPU board processes the RGB signal received from the CCD board and controls the following under the control of the main control board.

1. Controls exposure lamp on/off switching and voltage
2. Controls the speed of the scanner drive motor
3. Detects the original paper size
4. Controls on/off switching for the scanner exhaust and optics cooling fans
5. Supplies the clock signals for the CCD board
6. Detects when the scanner is at home position

2.4.7 ORIGINAL SIZE DETECTION



A259D003.WMF

There are three APS sensors (reflective photosensors) in the optics cavity for original size detection. The original width sensor [A] detects the original width, while the original length sensors [B] and [C] detect the original length.

The original width sensor [A] and the original length sensor [B] have two internal beams. Each beam scans a different point of the exposure glass. The other original length sensor [C] uses only one beam.

If the original or platen cover is present over the scanning point for a particular sensor, the beam is reflected, and each reflected beam activates a photoelectric device.

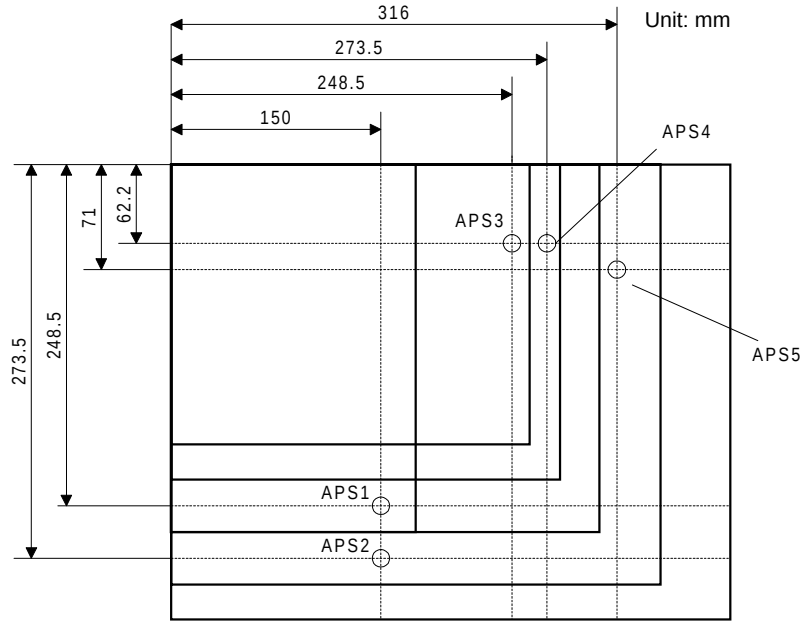
Original Size		APS1	APS2	APS3	APS4	APS5	
A4/A3 Version (metric)	LT/DLT Version (inch)						
A3	11 x 17	--	1	1	--	--	
B4	10 x 14	1	0	1	--	--	
F4	8 1/2 x 14	0	--	--	--	1	Metric: F4, F, or Folio, depending on SP5-126-001
A4-L	8 1/2 x 11	0	--	--	1	--	
A4-S	11 x 8 1/2	--	1	0	--	--	
B5-S	11 x 8 1/2	1	0	0	--	--	
B5-L	8 1/2 x 11	0	--	1	--	--	
A5-L	5 1/2 x 8 1/2	0	--	0	--	--	See Note

L: Lengthwise S: Sideways

0: No paper, 1: Paper present, --: Don't care

The diagram on the next page shows where the APS sensors are.

The machine cannot recognize the size of the original on the exposure glass if it is A5 lengthwise/HLT or smaller. Therefore, when all sensor outputs are off, the machine either will detect A5 lengthwise/HLT or will display an error message stating that it cannot detect the size of the original (this depends on SP 4-303).



A259D800.WMF

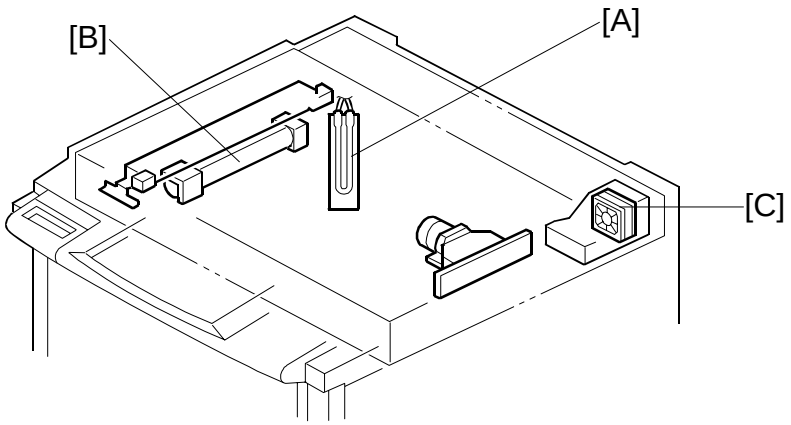
While the main switch is on, these sensors are active and the original size data is always sent to the main CPU. However, the main CPU checks the data only when the platen cover is open.

The check starts when the platen cover position sensor ([D] on the previous page) turns on; this is when the platen is about 15 cm above the exposure glass. At this time, only the sensors beneath the original receive the reflected light and are on; all other sensors are off.

The main CPU can recognize the original size from the signals from the sensors. If a copy is made with the platen open, the main CPU determines the size of the original from the sensor output at the time that the start key is pressed.

This original size detection method eliminates the necessity for pre-scanning, which increases the productivity of the machine.

2.4.8 OTHERS



A259D004.WMF

Anti-condensation Heater

There is an anti-condensation heater [A] on the left side of the optical base plate. It turns on when the main switch is off (if the machine is plugged into the wall outlet), to prevent moisture from forming on the optics.

Fans

Optics Cooling Fan

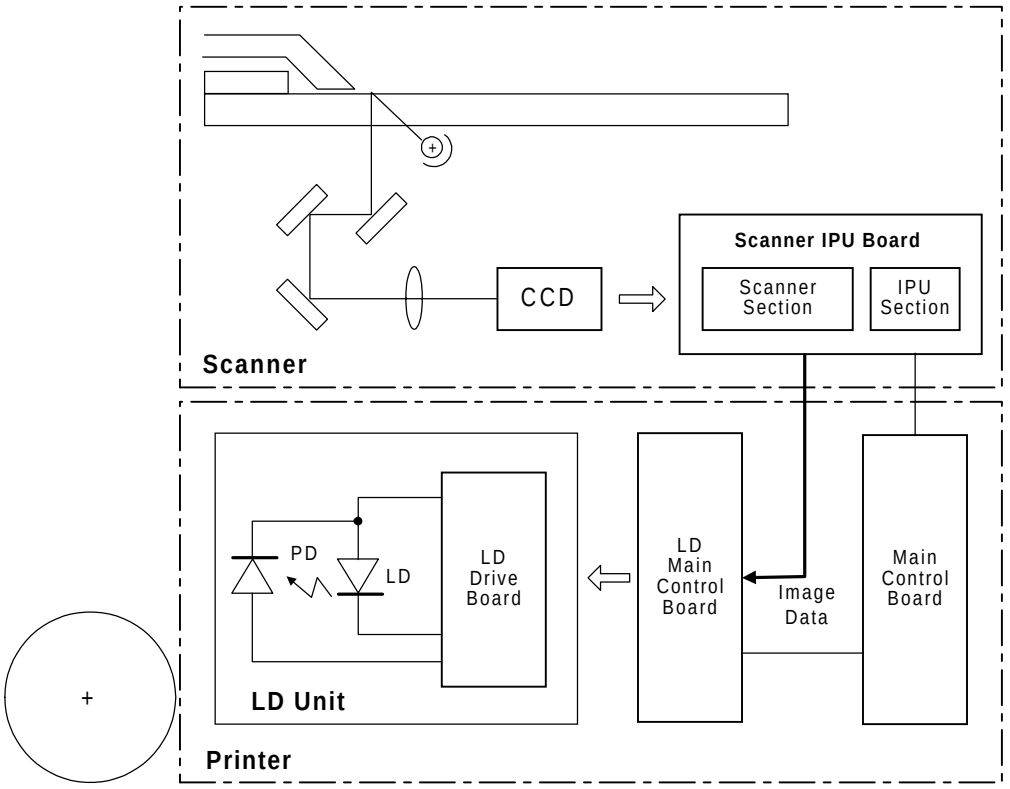
The optics cooling fan [B] is on the left side of the optics cavity. The fan sends air into the optics cavity to prevent the exposure lamp and optics cavity from overheating during copy cycles. This fan is on only when the exposure lamp is on.

Optics Exhaust Fan

The optics exhaust fan [C] is on the right rear side of the optics cavity. This fan moves air out of the optics cavity to keep it from overheating. This fan is always on when the main switch is on. During the ready condition, the rotation of the fan drops to 2/3 of the full speed.

2.5 IMAGE PROCESSING

2.5.1 OVERVIEW

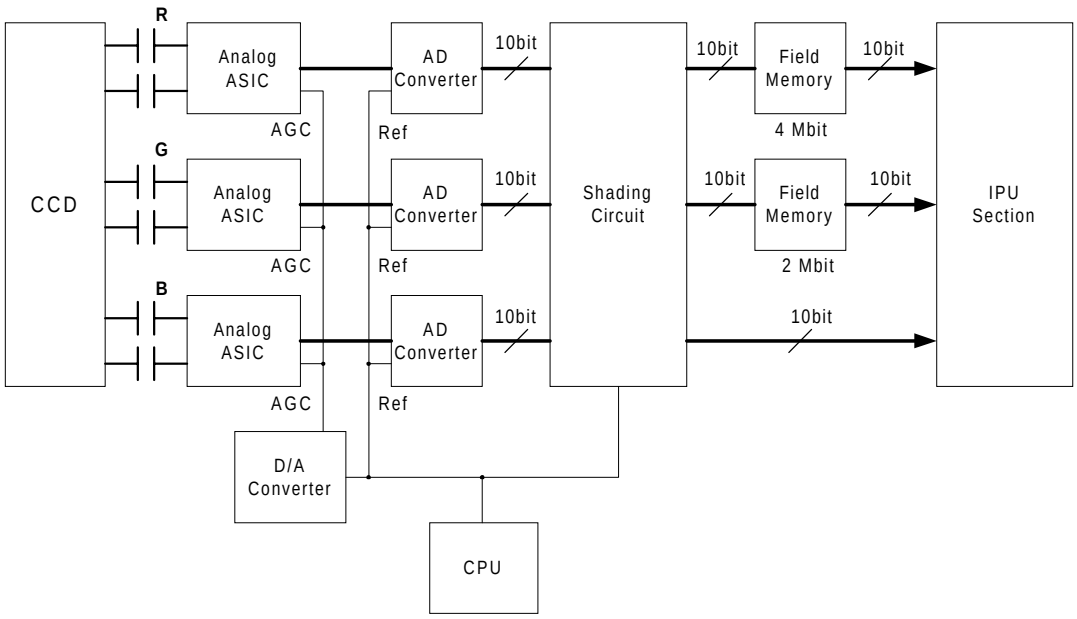


A259X002.WMF

The light from the exposure lamp is reflected by the original onto the CCD board. The CCD board has a CCD (Charge Coupled Device) with a three-line (RGB) filter. The reflected light is converted to analog image data signals, and these are transferred to the scanner IPU board.

The scanner IPU board does the following: A/D conversion (to 10-bit data), shading, D/A conversion for shading compensation, scan line correction, and image processing. In the IPU section, image data (10 bit) is converted to 8-bit data. This 8-bit data is sent from the scanner IPU board to the LD main control board.

2.5.2 SCANNER SECTION BLOCK DIAGRAM



A259X003.WMF

AGC (Auto Gain Control): Controls the amplification factor for the signals, using the white level signal that is fed back from the shading circuit.

2.5.3 SCANNER SECTION

Photoelectric Conversion (by the CCD)

The color CCD converts the light reflected from the original into RGB analog signals (6.615 MHz for each signal: even-pixel and odd-pixel). Each CCD line has 5,000 pixels and a resolution of 400 dpi (15.7 pixels/mm).

Signal Processing (in the Analog ASIC)

(1) Signal Amplification

Operational amplifiers boost odd-pixel and even-pixel RGB analog signals from the CCD.

(2) Signal Composition

For each color, the two amplified signals (even-pixel and odd-pixel) are combined by the multiplexer inside the Analog ASIC before A/D conversion.

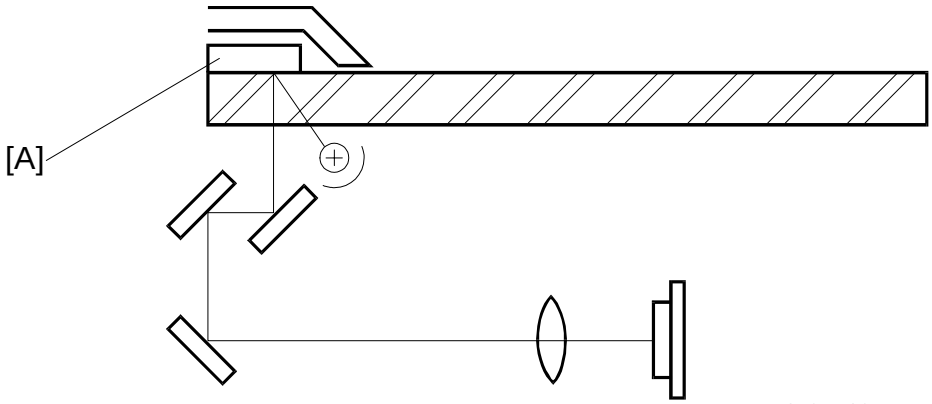
(3) Feedback

The CPU on the scanner IPU board receives the white level and black level from the shading circuits. Then it feeds this data to the clamps and the operational amplifiers inside the Analog ASIC through the D/A converter (see D/A Conversion). The CPU updates the black and white level every time the main switch is turned on.

A/D Conversion

The A/D Converter converts the analog signals (for each RGB color) to 10-bit digital signals (1024 grades) per pixel.

Shading Circuit

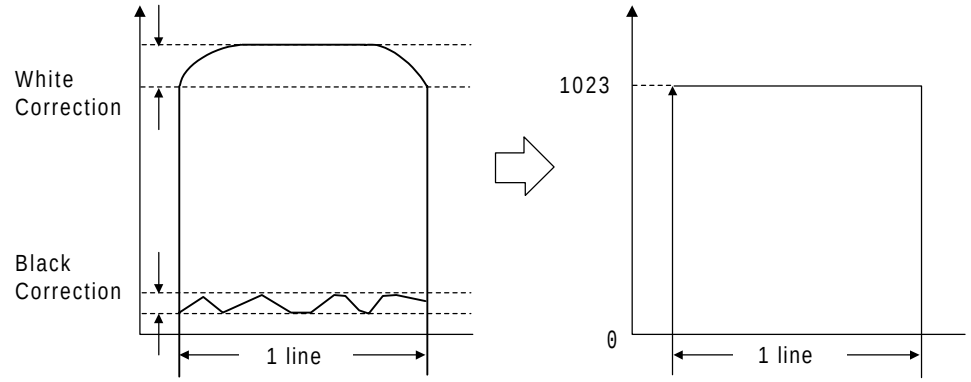


(1) Shading Compensation

Before scanning each original, the machine generates a reference white waveform (also known as "white shading data") by scanning 5 mm of the white reference plate [A] in the sub-scan direction (this equals 79 lines at 100% magnification).

The white shading data is calculated for each pixel across the main scan. To do this for a particular pixel, the machine takes the white levels for that pixel on each of the main scan lines taken from the white reference plate, and calculates a value from these. The white waveform is made by repeating this process for each pixel across the main scan.

To improve image reproduction for high-density areas, the machine also measures the black shading data. It does this by reading the black video level at the first 4 pixels of the CCD, which should be black because these pixels are masked off. The average of the 4 pixels is represented as the black shading data for one CCD scan line.



A259X005.WMF

The shading circuit corrects the video signal for each pixel obtained during image scanning as follows:

$$\frac{\text{(Video data for each pixel)} - \text{(Black shading data for each line)}}{\text{(White shading data for each pixel)} - \text{(Black shading data for each line)}} \times 1023$$

The white shading data is updated before every first scanning (2C and 4C mode) or every scanning (1C mode). The black shading data is updated every scan line. The white shading data is used to correct the image data for irregularities in the CCD and in the optics across the main scan. The black shading data is used to correct the image data for any changes in black level with time, while the machine scans down the page.

(2) Main Scan Timing

The shading circuit generates the CCD timing signals, and the timing signals for feeding back the black and white level data from the shading circuit to the Analog ASIC.

(3) Sub-scan Timing

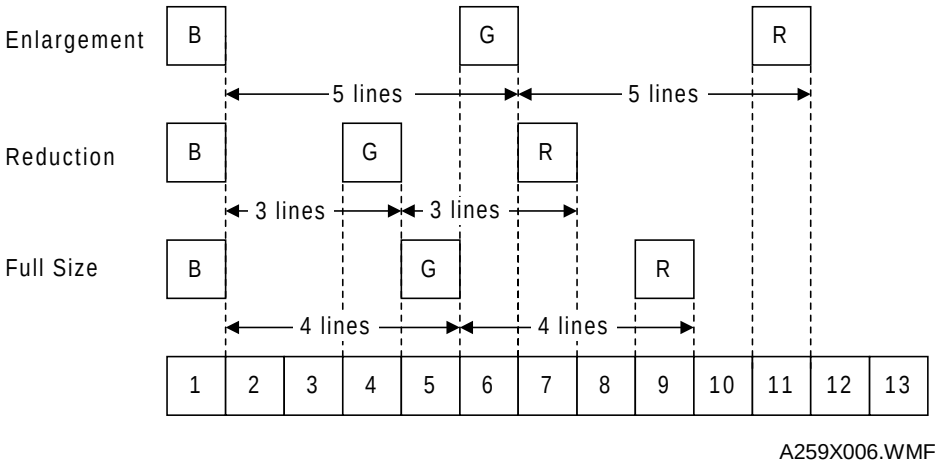
The shading circuit also generates the synchronization signal for scan line correction (see the next page for details on this process).

D/A Conversion

The CPU monitors the digital feedback signals from the shading circuits and calculates correction factors. Then the D/A circuit converts the signals from the CPU into analog signals and feeds them back to the operational amplifiers and the clamps inside the Analog ASICs. Black shading data is fed back to the clamps to provide a black level reference. This is done for every CCD pixel to calibrate the black level, and avoid drifts in the signal with time.

Scan Line Correction

The three CCD lines providing the RGB signals are spaced 4 lines apart on the original image (when the user selects full size magnification). To compensate for this discrepancy, the scan line correction circuits synchronize the output timing of the RGB signals with the IPU section by storing the scan data for each line in memory. As the discrepancy between RGB video signals changes depending on the magnification ratio, the correction data is calculated as follows:

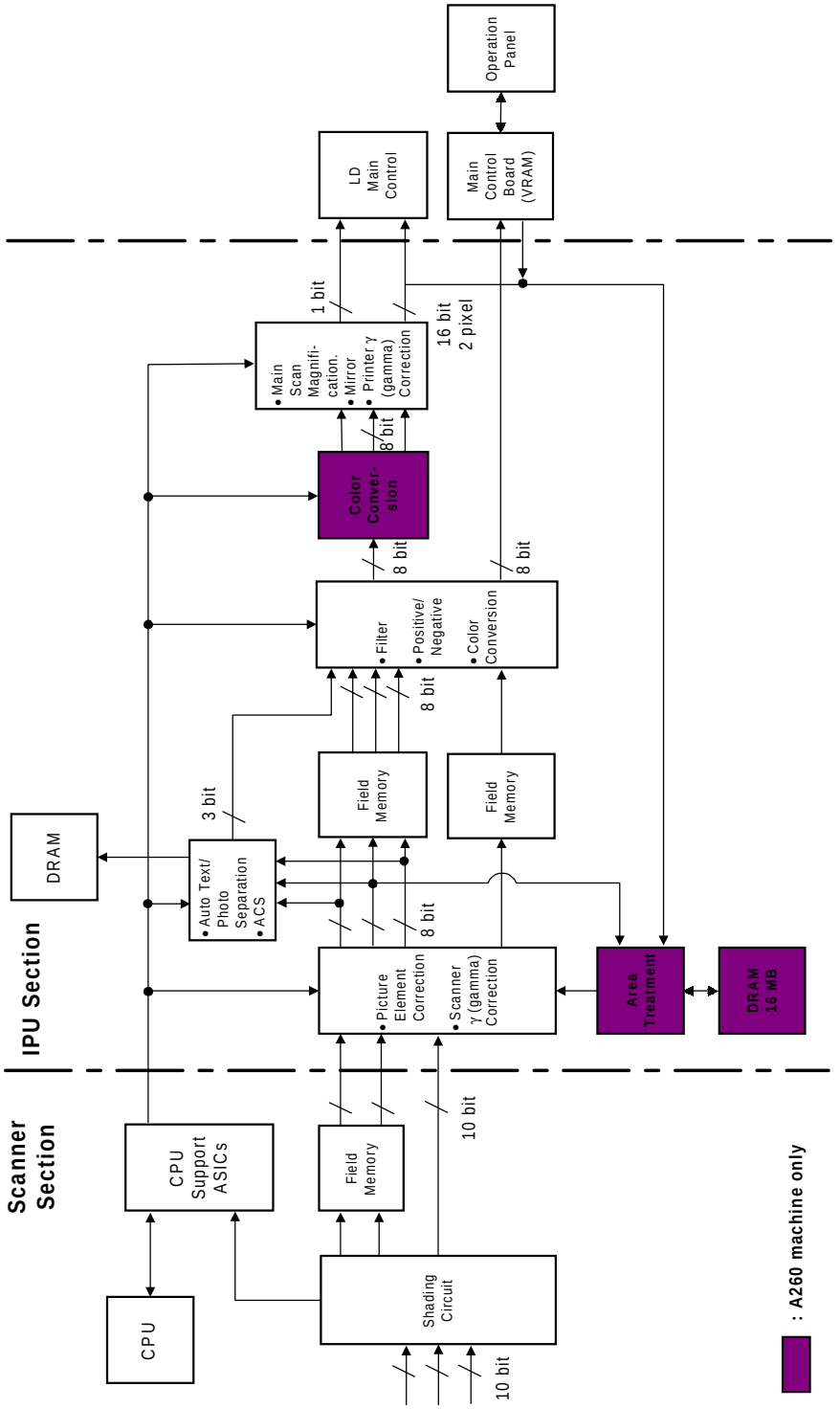


A259X006.WMF

B: Standard (No correction)
G: (4 lines) x (Magnification ratio)
R: (8 lines) x (Magnification ratio)

If this calculation does not result in an integer, the correction data is set to the closest integer, but further correction is needed (refer to IPU Section – Picture Element Correction).

2.5.4 IPU SECTION BLOCK DIAGRAM

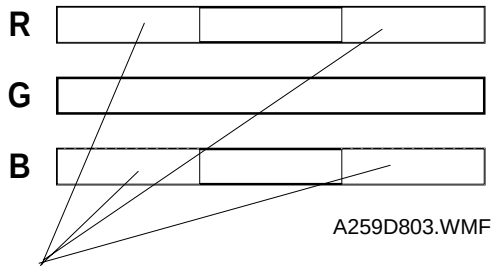


A259X007.WMF

2.5.5 IPU SECTION

Picture Element Correction and Scanner Gamma Correction

(1) Picture Element Correction



Picture Element Correction

The Picture Element Correction circuit does two things.

1. Completion of the Scan Line Correction process

The discrepancy in the spacing of the RGB signals from the CCD in the sub-scan direction is corrected by the line correction circuit in the scanner section (refer to Scanner Section – Scan Line Correction). However, if the correction data corresponding to the magnification ratio is not an integer, then further correction is needed to synchronize the RGB signals.

2. Correction if the CCD is not perpendicular to the light

If the CCD board is not perpendicular to the light axis, the position of each pixel is different from the original image position. This difference becomes larger towards the ends. Under this condition, vertical black lines (in the sub-scan direction) at the left and right edges of the original are colored because the Y, M, and C toner dots are not properly positioned. (This can be checked by looking at the vertical lines at the right and left edges of a copy of the C4 color chart.)

Therefore, the CCD line spacing is also corrected here. The target areas for this correction are shown above. The green CCD line is taken as a standard, and the ends of the red and blue lines are corrected.

Adjust SP modes 4-932-001 to 4-932-004 to change the vertical line correction level.

(2) Scanner Gamma Correction (RGB Gamma)

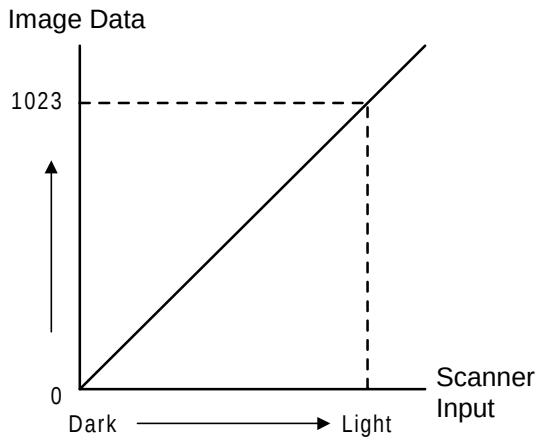


Fig. 1 A259X008.WMF

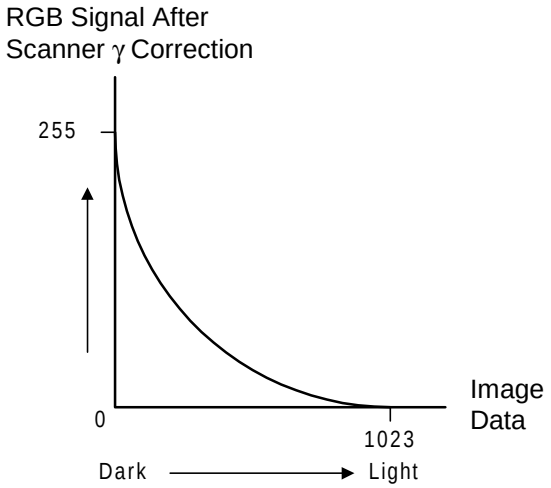


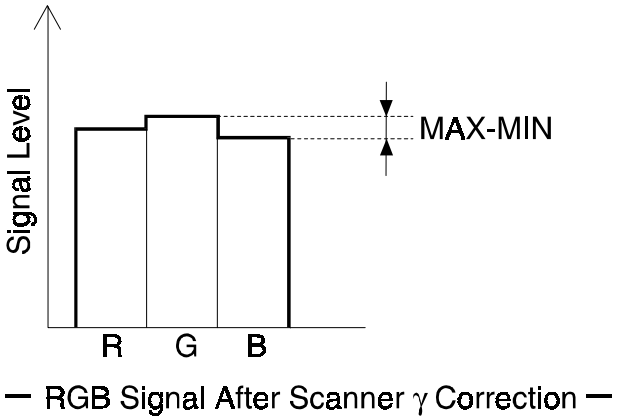
Fig. 2 A259X009.WMF

The RGB video signals from the CCD are converted to 10-bit digital signals in the scanner section and sent to the IPU section. These signals are proportional to the intensity of light reflected from the original image (Fig. 1). However, the IPU section converts the signal levels as shown in figure 2 by using a gamma (γ) correction table in order to improve the accuracy of RGB to CMY color conversion, which is done later in the image process. The same table is used for R, G, and B signals.

The scanner gamma (γ) correction inverts the video signals and converts the signal from 10-bit to 8-bit as outlined in the following table:

	Dark (Black) →	**Light (White)**
Scanner Input (RBG)	0 →	1023
After γ Correction (RGB)	255 →	0
↓		
Color Conversion		
↓		
Printer Output (CMYK)	255 →	0

ACS (Auto Color Selection)



A259D511.WMF

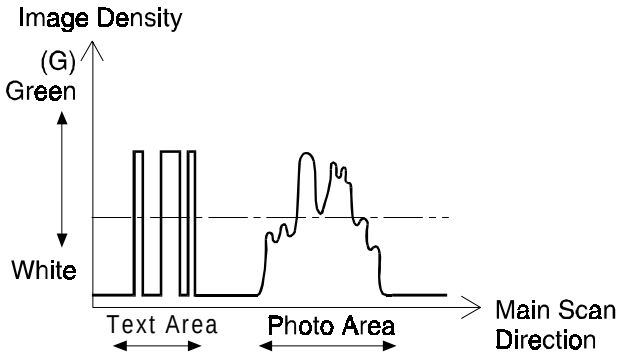
Auto color selection mode determines if an original is black/white or color. Then black copy mode or full color mode is automatically selected to match the original.

To recognize if the original has a color area or not, the RGB video signals are compared. If the maximum difference among RGB signal levels (MAX-MIN in the above diagram) is within a certain range, the pixel is considered black and white.

During the 1st scanning cycle, the latent image is developed with the amount of black toner specified by the gamma (γ) corrected RGB video signals. If the original does not have any color areas, the 2nd scanning is aborted and the developed image is transferred from the transfer belt to the copy paper. Then the black and white copy comes out. If the original has a color area, copying resumes in the full color copy mode (4 scans).

Users can maximize the quality of their output by selecting priority for Bk or full color original in ACS mode, using a User Tool (the default is Bk). The Bk setting prevents the UCR process from reducing the image density too much in low image density photo areas. This is explained in more detail in the section on UCR.

Auto Letter/Photo Separation



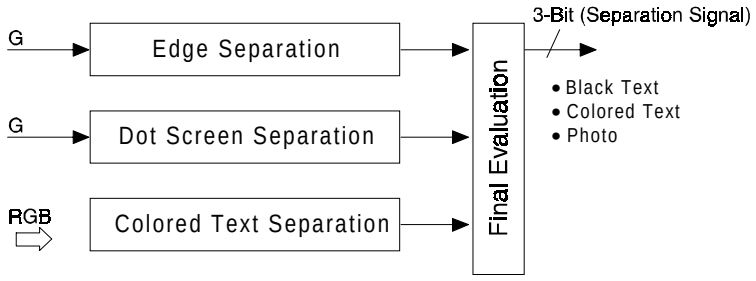
A259D512.WMF

In auto text/photo mode, the original image is separated into text and photo areas (dot screen areas).

"Text" refers to an original or area of an original that contains text and/or line drawings.

Generally, text areas have strong contrast between the image and the background. However, photo areas (dot screen areas) have a less extreme range of contrast levels.

Using these characteristics, the original image is separated into black text areas, colored text areas, and photo areas. The machine uses the following three separation methods to detect the different data areas, and the final evaluation circuit analyzes the output from these three processes to determine the result.



A259D513.WMF

(1) Edge separation

The edges of text and line diagram elements are identified by using the following characteristics: strong contrast, continuity of black or color pixels, continuity of white pixels around the black or color pixels

The machine can do this by only referring to the green signal.

(2) Dot screen separation

Dot screen areas are separated from non-dot screen areas (mainly text).

The machine determines that if white pixels are not detected around the non-white pixels, it is a dot screen area.

The machine can do this by only referring to the green signal.

(3) Colored text separation

Black pixels and color pixels in text areas are identified by determining the difference among the RGB maximum signal levels and the output levels of the RGB video signals.

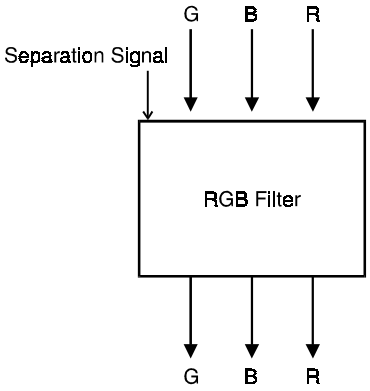
(4) Final evaluation circuit

The separation signal accompanies the data as it passes to the further stages of image processing. The separation signal tells the image processing circuits whether the data is black text, color text, or photo. The text areas are processed in text mode and the photo areas are processed in photo mode in the subsequent image processing steps.

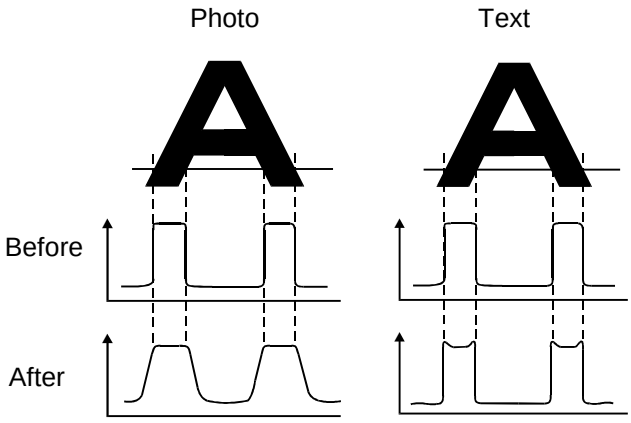
Auto text/photo separation is mostly effective only for small characters or thin line diagram elements. If there are large characters or solid line drawing elements in the original, only the edges of these are processed using text mode; the inner regions are processed using photo mode.

Filtering and Color Conversion

(1) RGB Smoothing Filter



A259D514.WMF

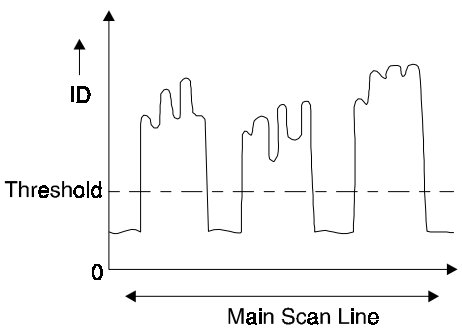


A259D515.WMF A259D521.WMF

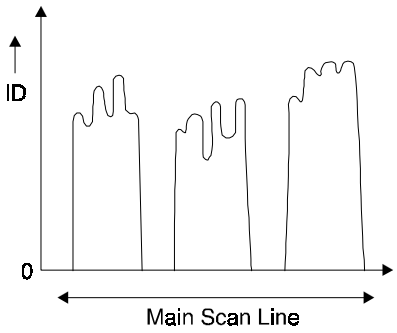
Depending on the results of auto text/photo separation (or depending on the selected original mode), the appropriate software filters are applied to the RGB video signals. The RGB smoothing filter is applied to photo areas; an edge emphasis filter is applied to text areas.

(2) Background Density Control and ADS (Auto Image Density Selection)

a. Background Density Control



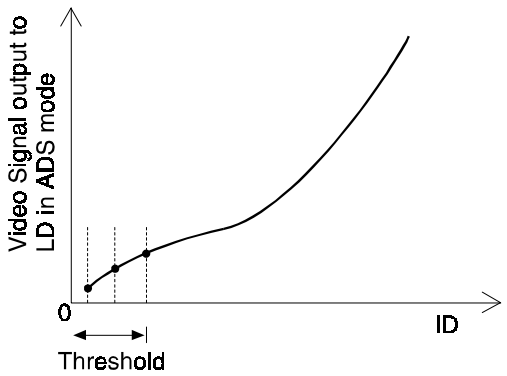
A259D522.WMF



A259D524.WMF

This function removes low ID image signals (background) that are less than a certain threshold. The threshold that is applied depends on the color mode (single color or full color). For each of these modes, the user can select a different threshold.

b. ADS (Auto Image Density Selection)



A259D523.WMF

In ADS mode, the user does not set the threshold; the machine calculates it, guided by input from the user for F/C and 2C mode (there are 5 settings in the "User Tools" menu).

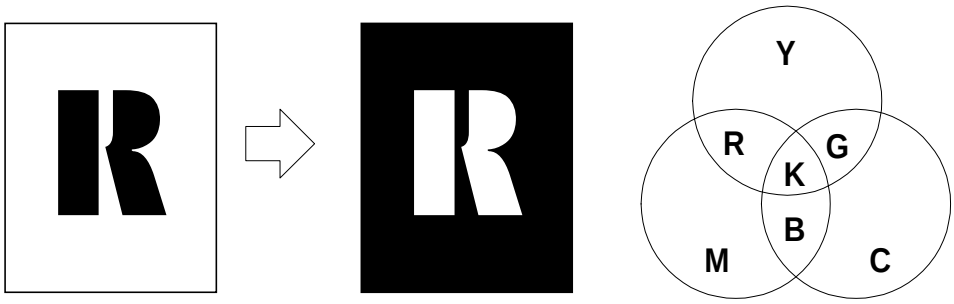
In full color mode, after the first scanning (Bk) the machine calculates the threshold for removing background by referring to the RGB data taken from the entire original.

In black and white mode, the machine detects the background level for the original, also known as the peak white level, and removes this from the image, to make a white background. Peak level data is taken for each scan line to correct for changes in background density down the page. From the peak white level, the machine determines the white reference value for A/D conversion. Therefore, in black and white mode the background density is controlled before data is input to the A/D converter.

(3) Positive/Negative Reverse

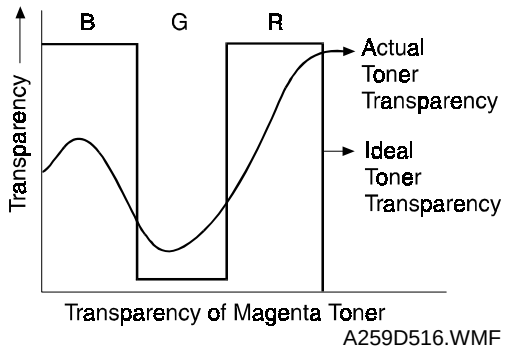
In the positive/negative mode, colors are changed to their complements as shown.

Red ↔ Cyan
Green ↔ Magenta
Blue ↔ Yellow



A259D804.WMF

(4) Color Conversion



A matrix converts the RGB video signals from each scanning cycle into YMCK video signals. The content of the matrix depends on the selected mode. The transparency for each color toner is not ideal, as shown above. Color conversion compensates for the difference between ideal and actual characteristics.

The following modes affect the matrix: color conversion mode (this is a user mode, not to be confused with the color conversion process described in this section), pastel mode, color balance mode, original mode (press print glossy photo, 2nd generation), RGB toner correction mode.

The following color conversion table is an example of the results from the matrix operation, for simple color copying without any special modes applied. For example, to represent green, the yellow and cyan toners are used in a proportion of 1:1.

Original Color / Toner	K	R	Y	G	C	B	M	W
Y	1	1	1	1	0	0	0	0
M	1	1	0	0	0	1	1	0
C	1	0	0	1	1	1	0	0
K	1	0	0	0	0	0	0	0

Color Conversion Table

If the user selects a special mode, some of the values in this table may be between 0 and 1. The following page briefly explains the effects of some modes.

A. Color conversion mode

Color conversion mode is a user feature, not to be confused with color conversion (RGB to CMYK) described above. In color conversion mode, a selected color (C/M/Y/R/G/B/K/W) on an original that falls within the recognized thresholds for that color is converted into a different color on the copy. Up to 4 colors can be converted at one time. Convertible colors include C/M/Y/R/G/B/K/W/Yellow Green/Orange/Marine Blue/Beige/Pink/Purple, and 15 user colors (the user colors are for A259/A260 only). Changing the matrix parameters enables color conversion to occur.

For example, when changing Yellow to Black, the coefficients for the Yellow video signal in the color conversion table become: Y: 1, M: 1, C: 1, Bk: 1

B. Pastel mode

In pastel mode, the matrix parameters change, and the output of the combined YMCK data shifts to a value between 100 % and 25 %. There are 9 steps, and the value used depends on the user's selection.

C. Color balance mode

In color balance mode, the data output for each color (YMCK) can be changed independently by changing the matrix parameters. There are nine possible values for each color.

D. Original mode

There are three modes within photo mode (Press Print, Glossy Photo, and 2nd Generation) and three types of special original mode (Marker Pen, Inkjet, Map). The machine selects the most suitable matrix for the original type that is selected by the user at the operation panel.

For inkjet mode, the user can select one of three different inkjet gamma (γ) tables to emulate the output of three different types of inkjet printer. (This is done with the User Tools.)

E. RGB toner correction mode

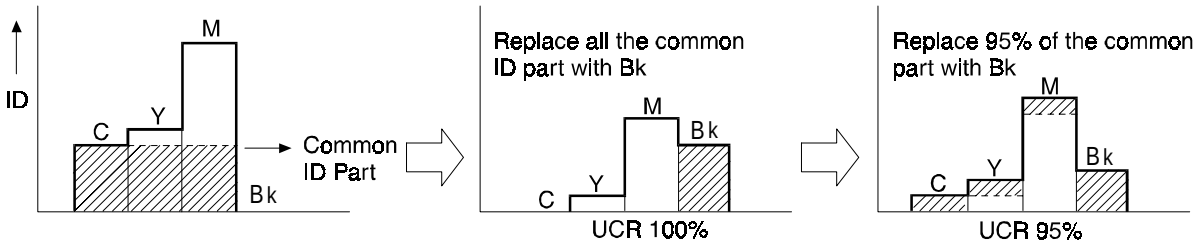
The toner mixing ratios for R, G, and B are adjustable (SP 5-611-001 to 5-611-006). The adjustments are valid for 2C (R, G, or B) copy mode only.

F. Twin color mode

Twin color mode separates black areas and colored areas. The machine then converts black to one color (that was selected by the user) and all the color areas another color(also selected by the user) so the output has only two colors. For A258, there are 12 selectable colors. For the A259/A260, there are 15 user colors in addition to this.

(5) UCR (Under Color Removal)

Principle



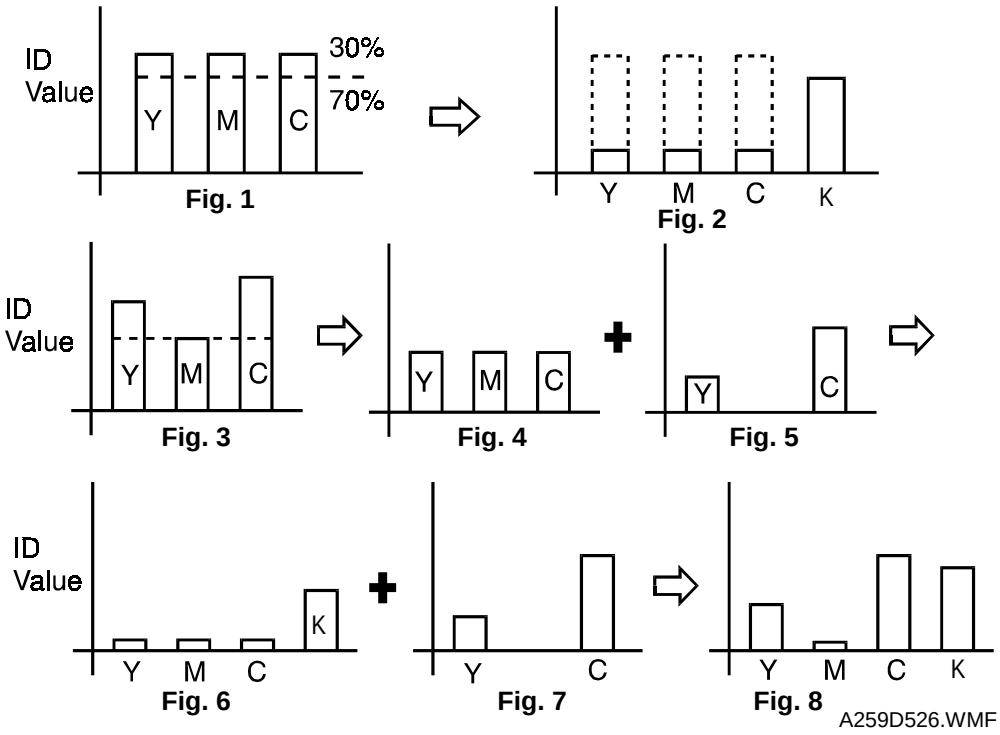
A259D525.WMF

Obtaining the right colors using YMC toner addition does not always work perfectly. For example, if the same quantity of toner for each color (YMC) is put on the paper, ideally the image should become black, but in reality it becomes a dark color, such as dark blue.

To compensate for this, an equal portion of the common ID value for each color is subtracted. This reduces the amount of color toner on the paper, and a proportional amount of black toner is added. This process is known as UCR.

The UCR ratio is the percentage of the common ID value for YMC that is subtracted and converted to black. In the above example, where the UCR ratio is 100%; the entire common ID value is subtracted from Y, M, and C, and converted to K.

In actual use, the UCR ratio depends on the color mode and the image density. For example, when the UCR ratio is 95%, 95% of the entire common ID value is subtracted from Y, M, and C, and converted to K.



In this example, the UCR ratio is 70%.

For a Black Image

When copying a black image, the ID values for all colors are equal (figure 1). For each color, the ID value is reduced by the amount of the UCR ratio (70% in the example). A black ID value equal to the 70% reduction is added to compensate for the color ID reduction (figure 2).

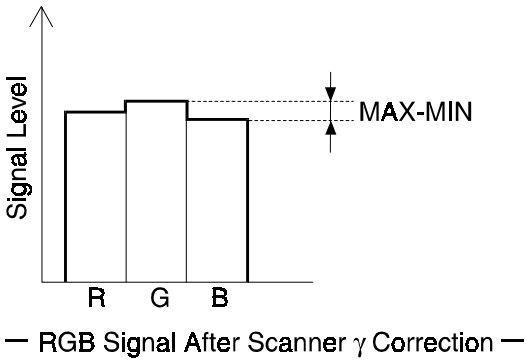
For a Color Image

When copying a color image, the color ID values differ from one another (figure 3). It is treated in two steps.

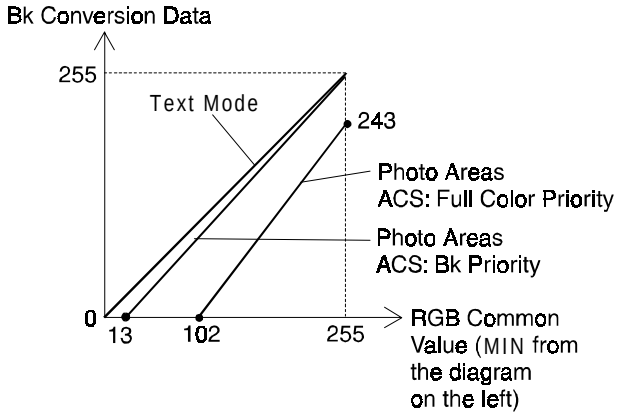
The ID value for this image is broken down into two parts (figure 4): a set of values equal to the lowest color ID value, and the remainders of the two higher values.

The part with equal values is treated as a black image (see figures 1 and 2), using the 70% UCR ratio. The resulting amounts are then added to the remainders from step 1 (figure 5). The result gives us the ID value for each color and for black (figure 6).

Changes in UCR Ratio with Image Density and Copy Mode



A259D511.WMF



A259D508.WMF

- Text Areas -

The UCR ratio in text areas is always 100%.

- Photo Areas, with ACS Priority set to Bk -

In photo areas, when the user sets the ACS priority to Bk, UCR begins to replace color toner with Bk toner at low image densities (when the RGB common value [MIN] is about 13). This prevents excessive reduction of the image density in low image density areas.

At this point, the UCR ratio is zero. As shown in the graph at the top right of the page, it gradually rises with the image density, and the UCR ratio is about 100% when MIN is 255.

- Photo Areas, with ACS Priority set to Full Color -

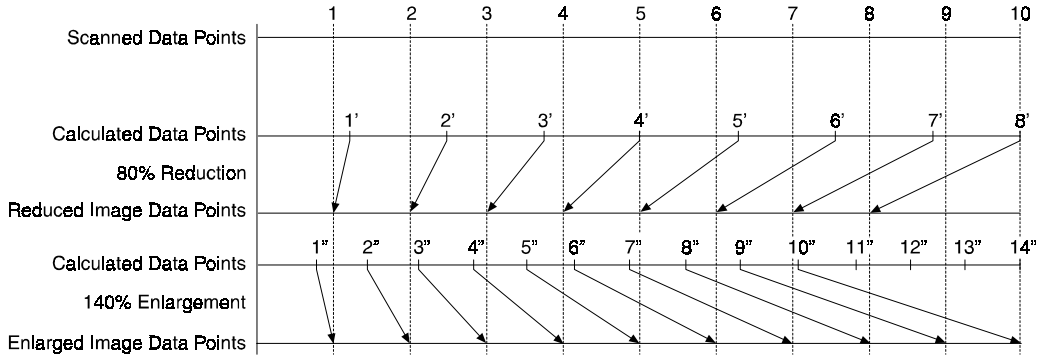
When the user sets the ACS priority to Full Color, the UCR process does not begin to replace color toner with Bk toner until a low-medium image density (when MIN is about 102).

At this point, the UCR ratio is zero. It gradually rises with image density, and the UCR ratio is about 95% when MIN is 255.

UCA (Under Color Addition)

Using only UCR processing, the copy lacks depth. So, a specified ratio of toner is always added for each color (YMC only). The amount of additional toner is proportional to the density of that color on the copy.

Main Scan Magnification



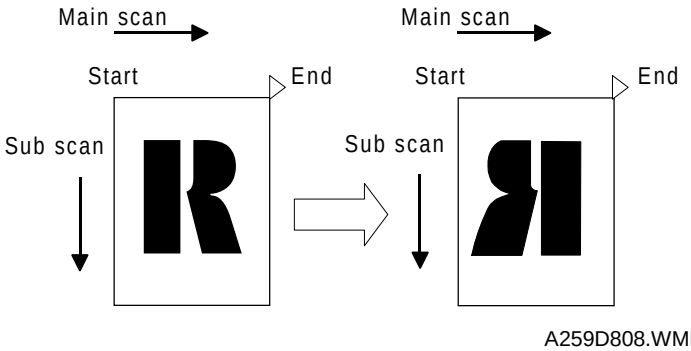
A259D527.WMF

The machine changes the scanner speed to reduce or enlarge the original in the sub-scan direction. However, an LSI on the IPU Board handles reduction and enlargement in the main scan direction.

Scanning and laser writing are done at a fixed pitch (the CCD elements cannot be squeezed or expanded). So, to reduce or enlarge an image, imaginary points are calculated that would correspond to a physical enlargement or reduction of the image. The correct image density is then calculated for each of the imaginary points based on the image data for the nearest two true points. The calculated image data then becomes the new (reduced or enlarged) image data.

NOTE: The actual calculations for main scan magnification use the polynomial convolution method. This mathematical process is beyond the scope of a service manual and will not be covered here.

Mirror Image



A259D808.WMF

Each line of video data is transferred to the laser unit in reverse (the end of the line is written on the OPC first).

Gamma (γ) Correction (Printer Gamma)

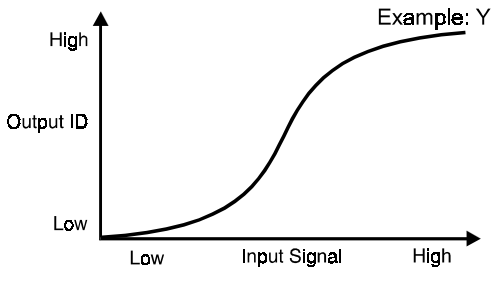


Fig. 1 A259D528.WMF

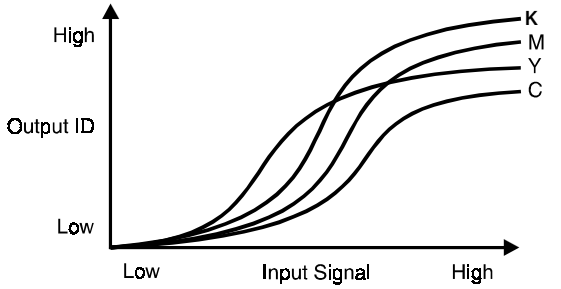


Fig. 2 A259D529.WMF

(1) KCMY Gamma

Ideally, the gamma curves for Yellow, Magenta, Cyan, and Black are identical, as shown in figure 1. However, they are not because electrical components always vary slightly, resulting in varying gamma curves, as shown in figure 2.

The Auto Color Calibration (ACC) procedure can compensate for any discrepancies in color reproduction. ACC makes new gamma curves for each color in each mode (text, photo, Bk text). After ACC, the gamma curve for each color can be adjusted with service programs (see Replacement and Adjustment, Copy Image Adjustment)

Using these programs, each gamma curve can be adjusted using 4 different modes: ID max., High ID, Middle ID, and Low ID, as shown on the following page.

If the previous gamma curve was better, the customer can recall it. Alternatively, the factory settings can be loaded using SP 5-610-004. In addition, the factory settings can be overwritten by the current gamma settings using SP5-160-005.

– ID max. –

This mode adjusts the total image density level as shown in figure 3.

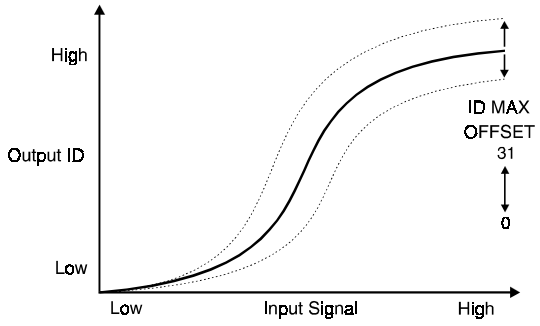


Fig. 3 A259D530.WMF

– High ID –

The High ID mode adjusts the image density between Level 6 and Level 9 of the color gradation scale on the C-4 test chart (figure 4).

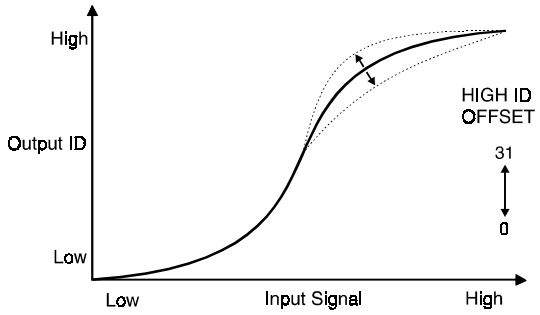


Fig. 4 A259D531.WMF

– Middle ID –

The Middle ID mode adjusts the image density between Level 3 and Level 7 of the color gradation scale on the C-4 test chart (figure 5).

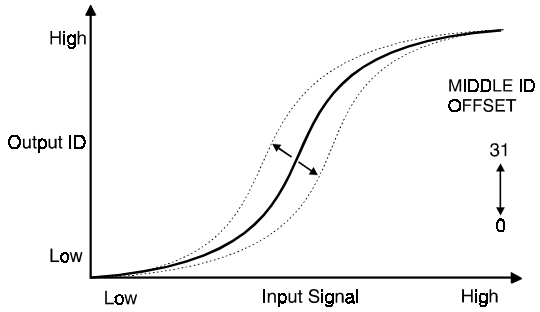


Fig. 5 A259D532.WMF

– Low ID –

The Low ID mode adjusts the image density between Level 2 and Level 5 of the color gradation scale on the C-4 test chart (figure 6).

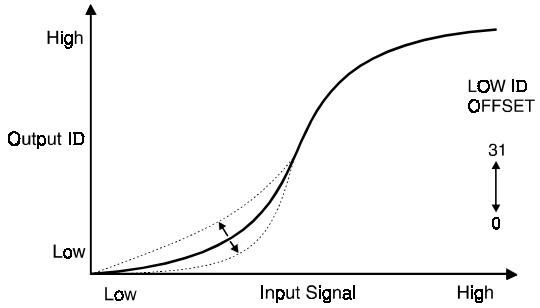
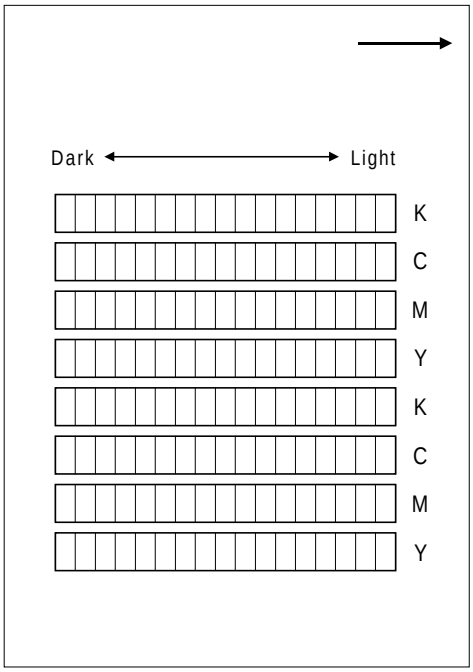


Fig. 6 A259D533.WMF

(2) ACC Test Pattern



A259X010.WMF

The IPU board firmware has a test pattern that has eight 17-step gradation scales for each color (KCMY), including background white, for Text and Photo modes.

(3) ACC (Auto Color Calibration)

This machine automatically calibrates the printer gamma curve when the user selects ACC.

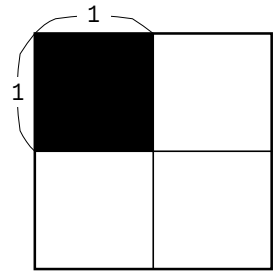
When ACC is activated, the machine prints out an ACC Test Pattern. The user puts the test pattern on the exposure glass, then the machine scans the test pattern. The machine scans eight lines, one for each color (KCMY) in text mode, and one for each color in photo mode.

The machine corrects the printer gamma by comparing the ideal settings with the current image density. Then the machine combines the corrected gamma curve with the High, Middle, and Low ID values currently in memory (these are not reset to the defaults first, as in some earlier models).

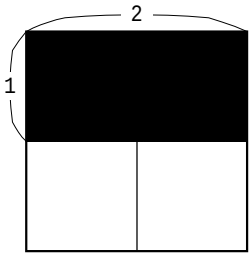
The machine the calculates the ID max (amplitude of the gamma curve) based on data from the ACC scan.

The corrected printer gamma curves can be adjusted further using SP mode, as discussed on the previous page (see Replacement and Adjustment, Copy Image Adjustment).

(4) Gradation Treatment (Dither Processing)



A259X011.WMF



A259X012.WMF

This machine has two kinds of dither patterns in copier mode.

In Text mode, the dither patterns are made with 1 x 1 dot units, to obtain fine resolution.

In Photo mode, the dither patterns are made with 2 x 1 dot units. Using the larger unit, the resolution is less fine, but the output is not sharply focused, which is more suitable for Photo mode.

Area Editing

In area editing mode, the pre-scanned image (8 bits) is transferred directly to the operation panel using the VRAM on the main control board. After designating the area on the display, the area data is sent to the IPU section and the scanned image is treated in the Area Treatment ASIC in accordance with the area data.

CPU

The CPU (32-bit) controls the image data and the timing in the scanner and IPU sections.

IPU Board Test

The scanner IPU board contains some LSIs, DRAM, SRAM, and other parts that control these.

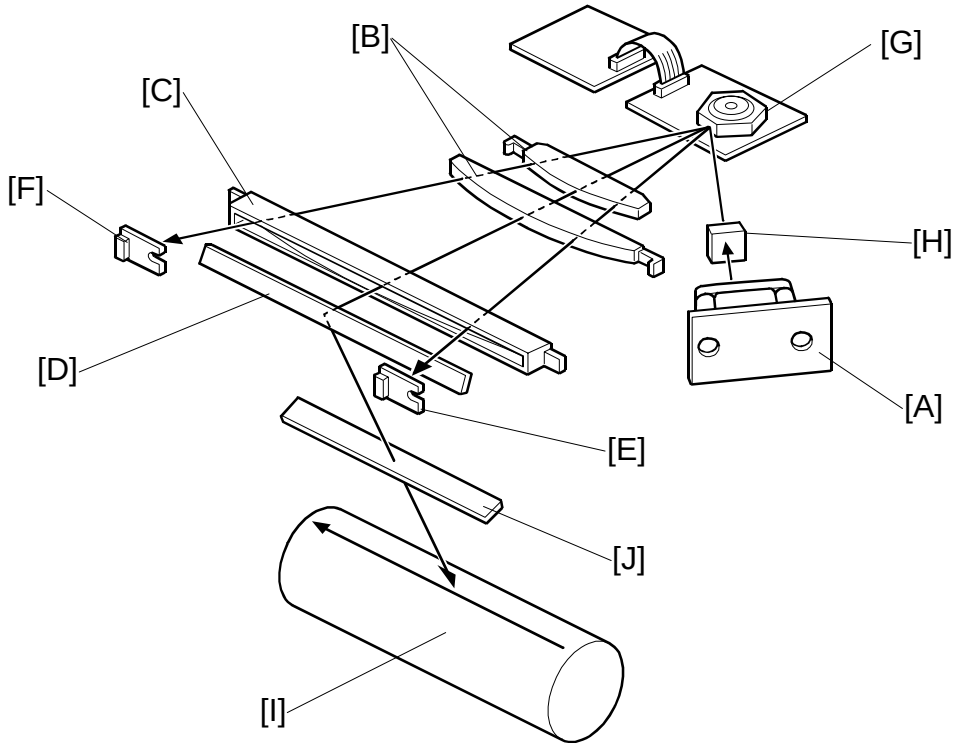
In SP mode, there are test programs to check if the board is defective or not (SP 4-904-001, 002: 0=OK, other = NG).

SP4-904-001: Read/write check for each ASIC

SP4-904-002: Generates patterns from the ASICs, writes them in the field memory and tests them.

2.6 LASER EXPOSURE

2.6.1 OVERVIEW



A259D102.WMF

A: Laser Diode Unit (LDU)	F: Laser Synchronization Detector Board-2 (LSDB-2)
B: F-theta Lenses	G: Polygon Mirror
C: Barrel Toroidal Lens (BTL)	H: Cylindrical Lens
D: Drum Mirror	I: OPC Drum
E: Laser Synchronization Detector Board-1 (LSDB-1)	J: Toner Shield Glass

This machine uses a laser diode to produce electrostatic images on an OPC drum [I]. The laser diode unit converts image data from the LD main control board into laser pulses, and the optical components direct these pulses to the drum.

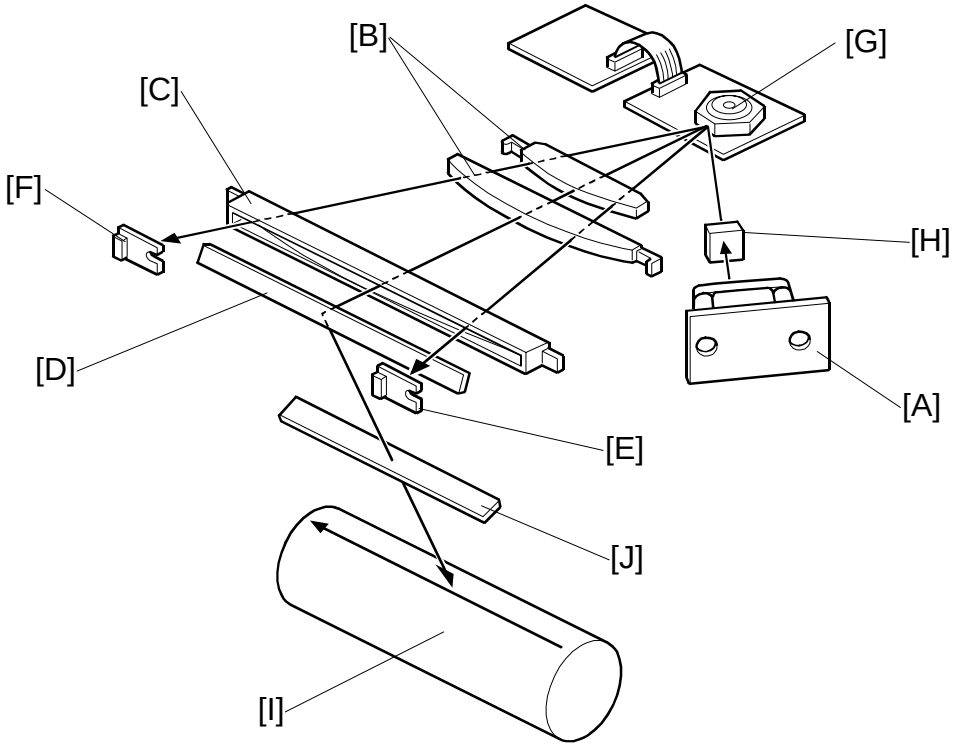
To produce a high quality copy image, there are 256 gradations for each pixel for each color. These gradations are produced by power modulation and pulse width modulation on the laser signal.

The laser beam writes the latent image on the drum. The laser beam makes the main scan while the drum rotation controls the sub-scan.

The strength of the beam is about 0.76 mW on the drum surface at a wavelength of 780 nm. (The rated output of the laser diode is 15 mW).

2.6.2 OPTICAL PATH

Overview



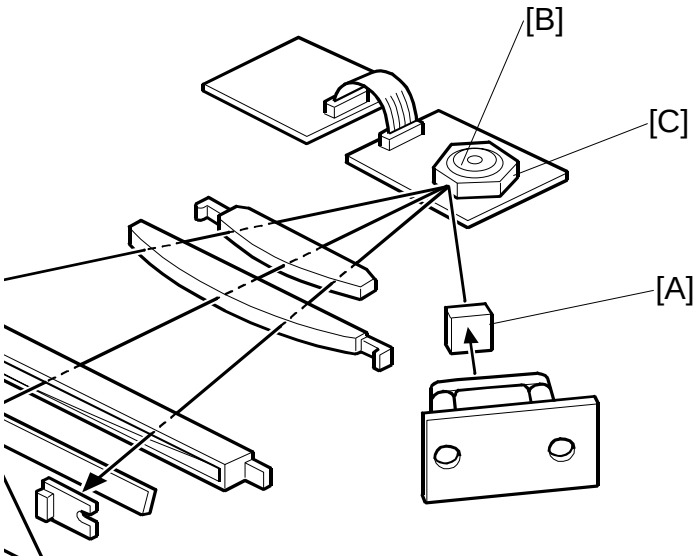
A259D102.WMF

The output path from the laser diode to the drum is shown above.

The LD unit [A] sends a laser beam to the polygon mirror [G] through the cylindrical lens [H].

Each side of the polygon mirror reflects a full main scan line. The laser beam goes through the f-theta lens [B] and BTL [C]. The drum mirror [D] reflects the laser beam onto the drum [I] through the toner shield glass [J].

The laser synchronizing detector boards [E, F] determine the main scan starting position, and detect variations in the time required to make a main scan.



A259D102.WMF

Cylindrical Lens

The cylindrical lens [A] focuses the laser beam and sends it to the polygon mirror.

Polygon Mirror

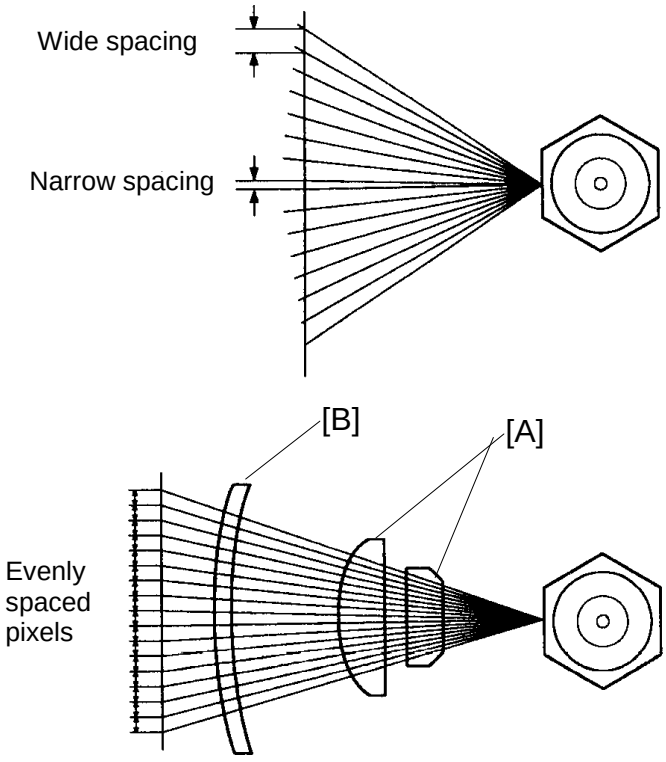
The polygon mirror assembly consists of the polygon mirror motor [B] and the polygon mirror itself [C].

As the mirror rotates, it reflects the laser beam across the drum, via the f-theta lens, BTL, and drum mirror. The beam reflected from one face of the polygon mirror makes one main scan line.

The mirror is precisely ground for high reflectivity and to prevent pixel misalignment on the drum in both the main scan and sub-scan directions.

The polygon mirror motor rotates at 24,567 rpm. One rotation corresponds to six main scans.

F-theta Lenses and the BTL

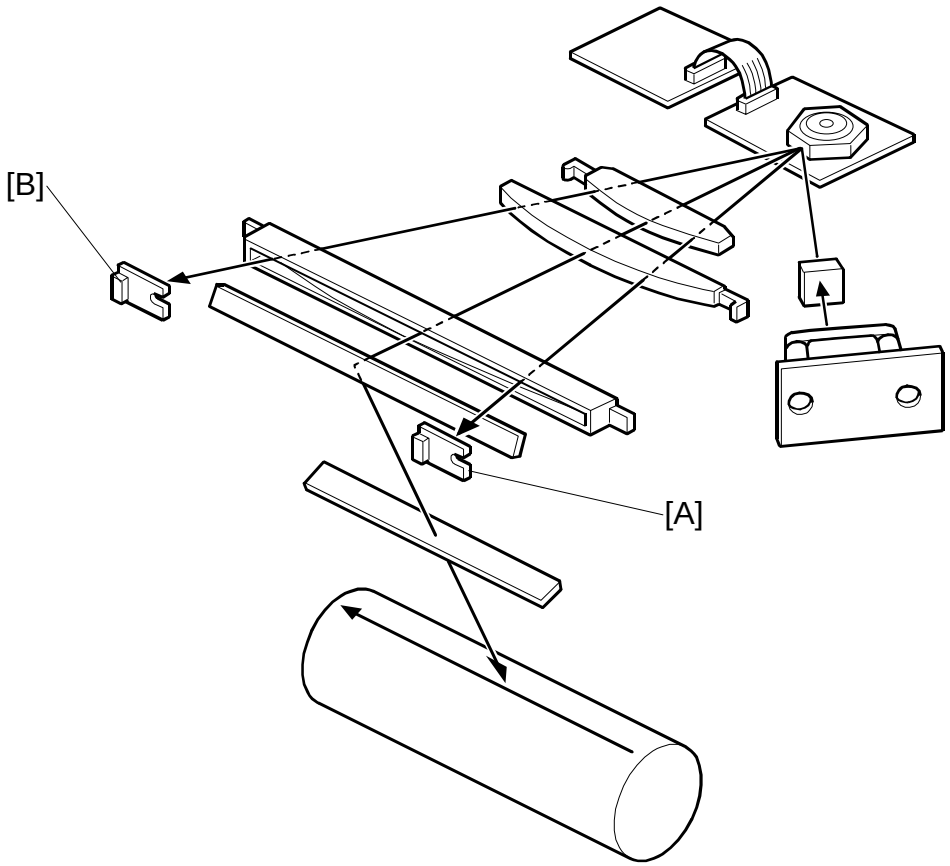


A259D504.PCX

The angles between pixels are equal. However, if the beam were to go directly to the drum as shown in the upper illustration, the spacing between pixels would depend on the angle of the beam. The pixels near the end of the drum would be further apart than the ones near the middle, and slightly thicker toward the ends of the drum than in the middle.

The f-theta lenses [A] and barrel toroidal lens (BTL) [B] correct for this by deflecting the beam slightly inward to ensure uniform pixel spacing and diameter. The f-theta lenses and BTL also correct for irregularities in the polygon mirror face, focusing irregular beams onto the correct part of the drum.

Laser Synchronizing Detector Boards



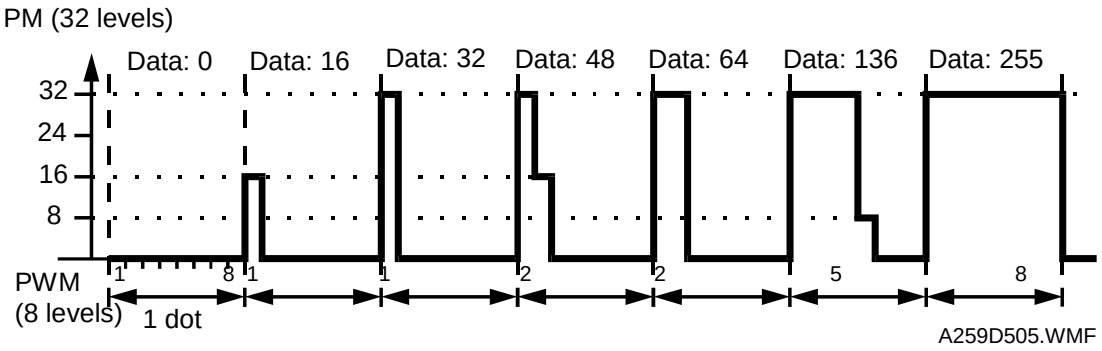
A259D102.WMF

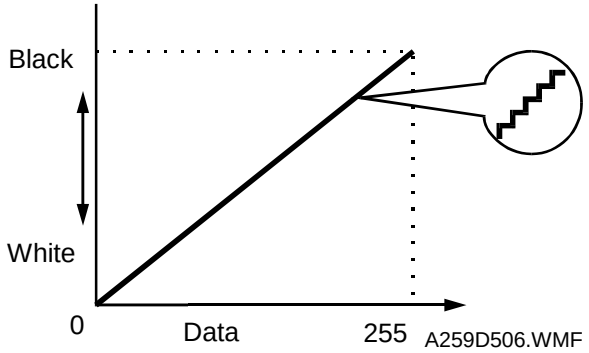
Some of the optical components are made of plastic, and may expand and contract with changes in temperature. If this happens, the number of pulses in the laser main scan across the drum will vary. To counteract the effects of this, the machine adjusts the gap between laser pixels to keep the number of laser pulses in each main scan constant.

To do this, the machine has two laser synchronizing detector boards. They determine the number of clock pulses between the start and end of each main scan. (These clock pulses are from the base clock, which is at a much higher frequency than the laser pixel frequency.)

The laser synchronizing detector board-1 [A] synchronizes the main scan start timing. At the other side, the laser synchronizing detector board-2 [B] counts the number of clock pulses since detector board-1 was activated; from this count and from the current laser pixel frequency, the machine can calculate how many laser pixels there were across the main scan.

Gradation Control (Laser Pulse Width and Laser Power Modulation)





To make the latent image, the laser beam illuminates the image area on the drum surface. The longer the laser is on and the more intense it is, the darker the developed pixel becomes. Modulating (changing) the width of the pulse makes the length of time that the laser is on longer or shorter. There are eight possible pulse width levels in this model.

While the laser is on to make one dot, the intensity of the laser is controlled by power modulation (PM). The laser's intensity is controlled by the amount of current sent to the laser diode. Modulating the power makes the laser brighter or dimmer. There are 32 possible power levels, or laser intensity levels.

The laser engine can use the 8 pulse width levels and 32 power levels to create the 256 possible grayscale values for each pixel for each color.

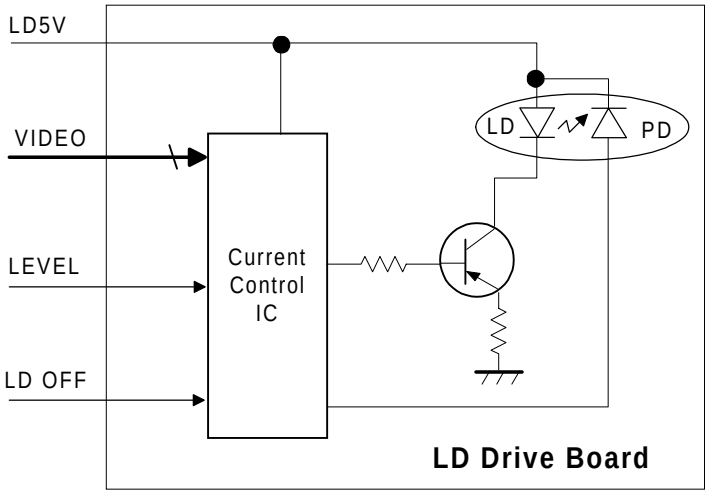
The power is modulated ONLY at the end of the active part of the on/off cycle of the laser pulse. For example (see the diagram above), to make a pixel with a grayscale value of 48, the laser pulse width level for that pixel will be 2. The first period of the pulse will be at the full power (32), and the second period will be at power 16 to make up the remainder of the 48 (32 + 16 = 48).

The LD power for each grade is defined by process control.

600 DPI Writing

In printer mode, the resolution is 600 dpi (in copier mode: 400 dpi). The LD writing frequency in printer mode shifts from 16.06 MHz (copier mode) to 24.08 MHz (printer mode), which is about 1.5 times. For the sub-scan, the drum motor speed shifts from 156 mm/s to 104 mm/s (2/3 speed).

Auto Power Control (APC)



A259D501.WMF

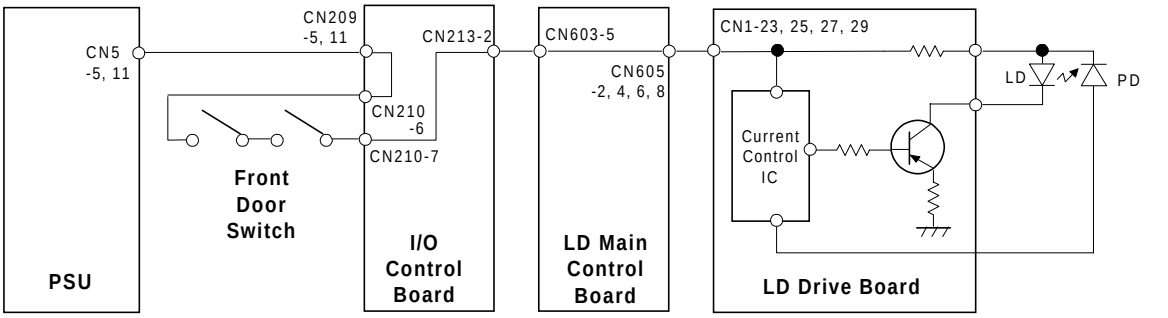
Even if a constant electric current is applied to the laser diode, the intensity of the output light changes with the temperature. The intensity of the output decreases as the temperature increases.

In order to keep the output level constant, the output light intensity is monitored through a photodiode (PD) enclosed in the laser diode. The photodiode passes an electrical current that is proportional to the light intensity. The output is not affected by temperature, so it faithfully reflects the changes in the LD output, without adding anything itself.

Just after the main switch is turned on, the current control IC on the LD drive board excites the laser diode at full power (power level 32) and stores the output of the photodiode as a reference. The current control IC monitors the current passing through the photodiode. Then it increases or decreases the current to the laser diode as necessary, comparing it with the reference level. Such auto power control is done during printing while the laser diode is active.

The laser power level is adjusted on the production line. Do NOT touch the variable resistors on the LD unit in the field.

LD Safety Switches



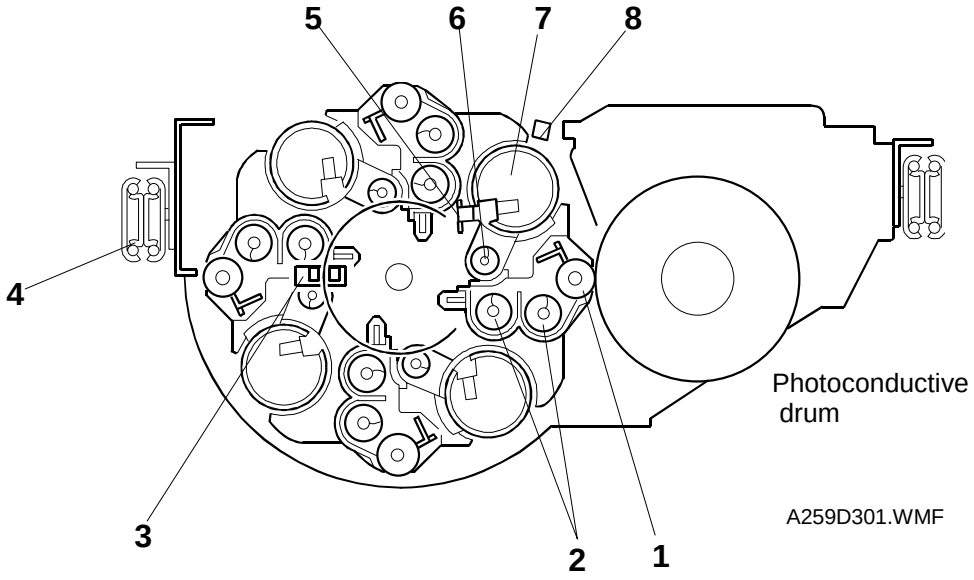
A259D500.WMF

The front door switch ensures that the laser beam does not accidentally switch on during servicing, while the front door is open. These switches are installed in series on the LD 5V line coming from the power supply board (PSU).

When the front cover is opened, the power supply to the laser diode is interrupted.

2.6 DEVELOPMENT UNIT

2.6.1 OVERVIEW



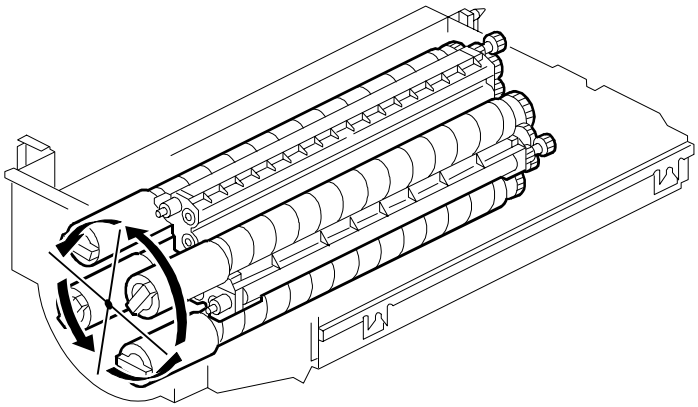
The development unit is a revolver type. The revolver rotates counter-clockwise to develop colors in the order of K, Y, C, and M. The development and drum units are in the drawer unit.

There is no sub-hopper; each color toner is supplied directly to the development unit from the toner bottle.

1. Development roller
2. Mixing augers
3. Revolver H.P. sensor
4. Drawer unit slide rail
5. Toner end sensor
6. Toner supply auger
7. Toner cartridge
8. Toner cartridge set sensor

2.6.2 REVOLVER MECHANISM

Overview



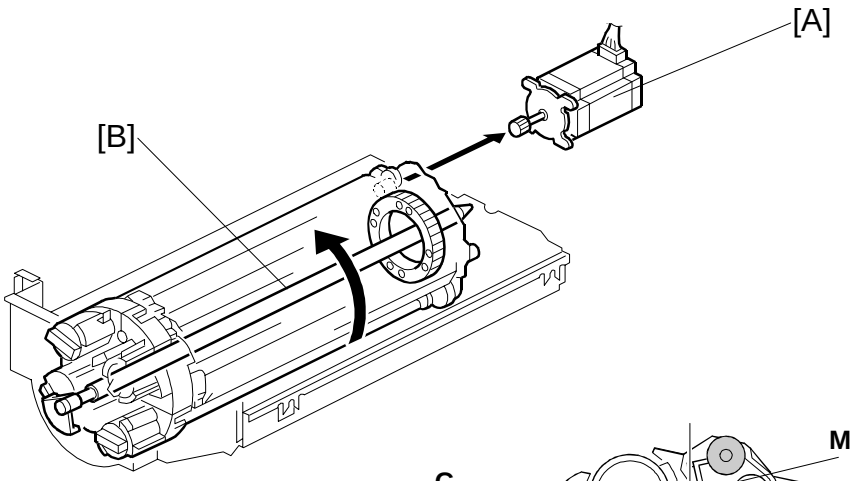
A259D302.WMF

The revolver unit is composed of four development units, one for each color (KYCM). It develops colors by rotating the revolver counter-clockwise (as viewed from the front of the copier), 90 degrees at a time, in the order of K, Y, C, and M.

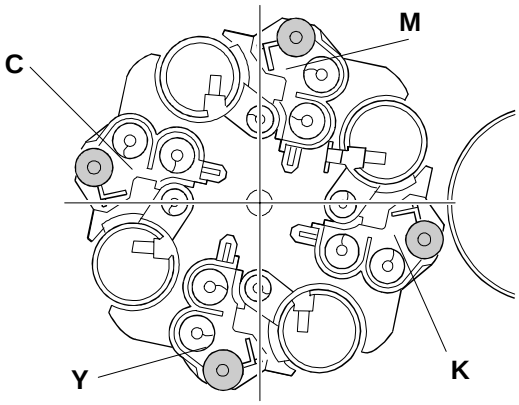
In printer mode, development is carried out in the order of Y, C, M, and K. Developing k last improves the reproduction of black letters.

The development units for each color can be removed easily.

Revolver Drive



A259D303.WMF



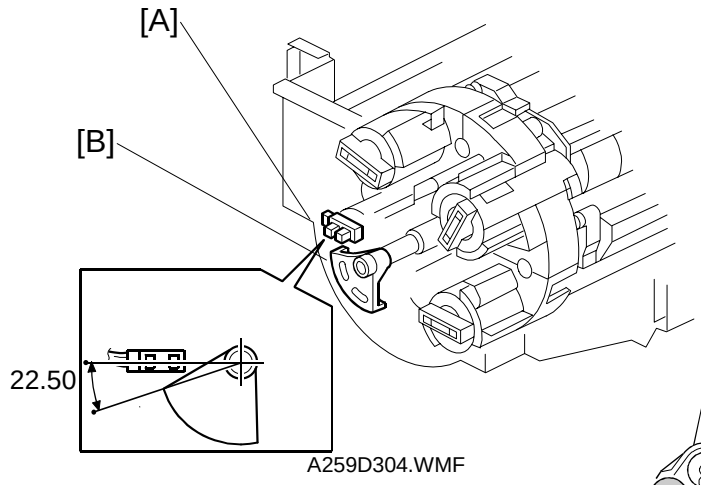
A259D317.WMF

The revolver drive motor [A] turns the revolver unit around the revolver shaft [B].

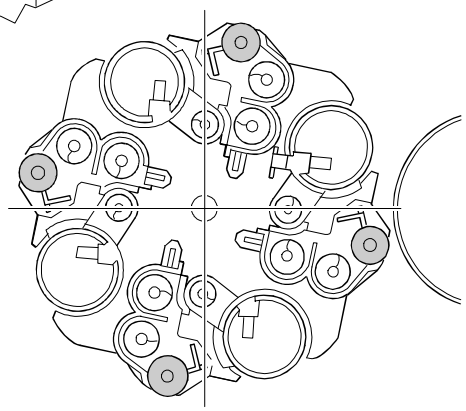
The revolver rotates counter-clockwise as viewed from the front of the copier in 90-degree steps. The revolver unit home position lies 22.5 degrees before the K development position, so the revolver is turned 22.5 degrees before starting development.

The revolver drive motor is a two-phase stepper motor.

Revolver Home Position Detection



A259D304.WMF



A259D317.WMF

The revolver H.P. sensor [A] is at the front of the drawer unit. The actuator [B] is attached to the revolver shaft. The revolver is at home position when the edge of the actuator just enters the sensor.

For both copy and printer mode, the home position is 22.5 degrees before the K development position. This clearance between the development sleeve and the drum prevents the drum surface from becoming dirty and minimizes toner wastage when development is not taking place.

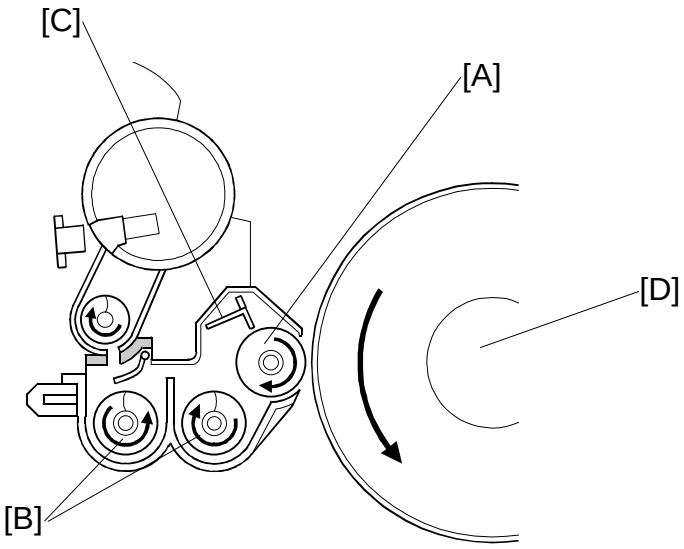
Whenever a copy job ends, the copier returns the revolver to home position. It also does this when the copier is turned on and when the front door is opened or closed.

The toner bottle is locked so that it cannot be removed or installed. However, when there is a toner near end or toner end condition, the revolver stops at a different position in standby mode so that the toner bottle can be changed. Then, when the user makes a copy, the revolver goes to home position first, before the copy is made.

SC361 is generated when a revolver H.P. sensor error occurs.

2.6.3 DEVELOPMENT MECHANISMS

Overview



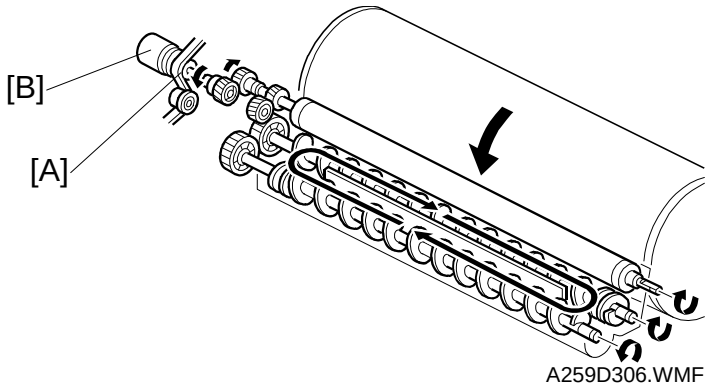
A259D318.WMF

The developer (380 g) in each development unit is supplied to the development roller [A] by the two mixing augers [B] and attracted onto the roller surface by the magnets inside the development roller.

The attracted developer is trimmed to the desired thickness by the magnetic doctor [C], and then carried out to the drum [D] where the latent image is developed. The magnetic doctor blade reduces the developer setting time. It also maintains the image density more effectively than a non-magnetic doctor blade.

The uniform clearance (photoconductor gap: PG) between the development roller [A] and the drum [D] is guaranteed because the cover around the development unit shaft fits into the drawer tightly at the front and at the rear.

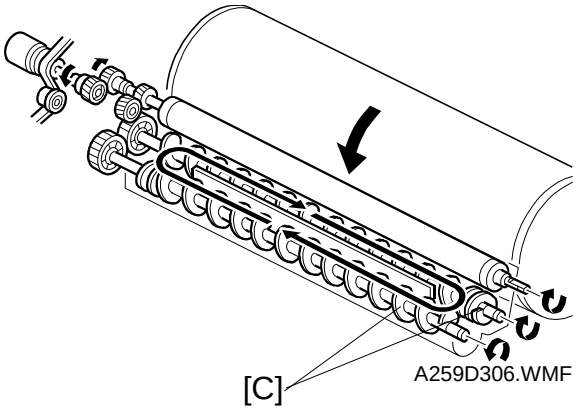
Development Drive



The revolver unit contains four development mechanisms. At any one time, only one development mechanism is driven (the one for the color that is being developed).

The drum motor drives the development roller and screws via the timing belt [A] and development clutch [B], and rotates the toner bottle through gears (see Toner Agitation).

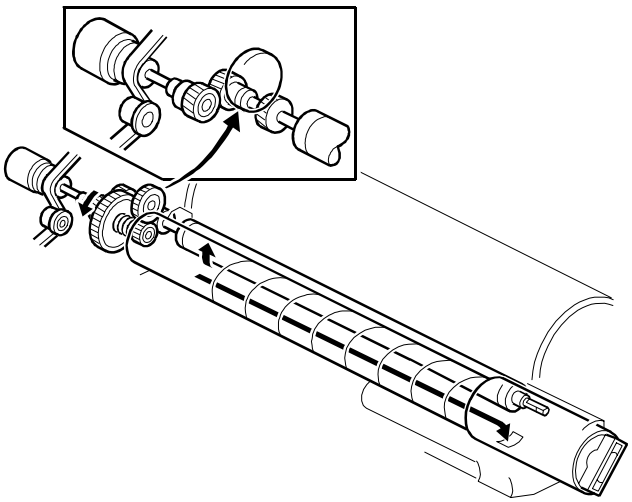
Developer Agitation



The two transfer augers [C] circulate the developer forward and backward to agitate the developer. This is a more compact system than the paddle mechanism in older models.

Developer is agitated during the process control self check, during toner supply, and during development (only for the color being used).

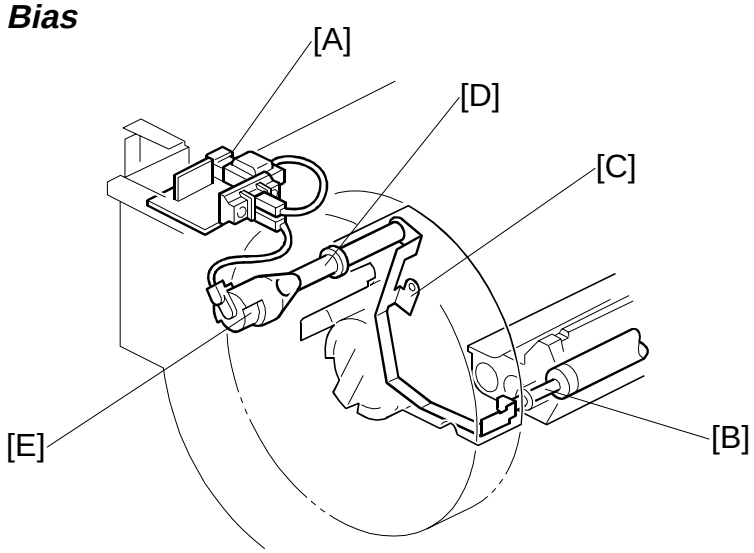
Toner Agitation



A259D314.WMF

When the drum motor drives the development mechanism that is at the development position, it also turns the toner bottle through gears, and this agitates the toner.

Development Bias



A259D315.WMF

This is a revolver development mechanism, so there is only one bias terminal.

When a development unit is at the development position, the development input shaft [D] is in contact with the bias terminal [E] at the front of the drawer unit. At this time, voltage passes from the high voltage supply board – B [A] to the development roller shaft [B] through a spring plate [C]

The bias terminal has a spring to push against the development input shaft to prevent poor terminal contact when the development unit reaches the development position.

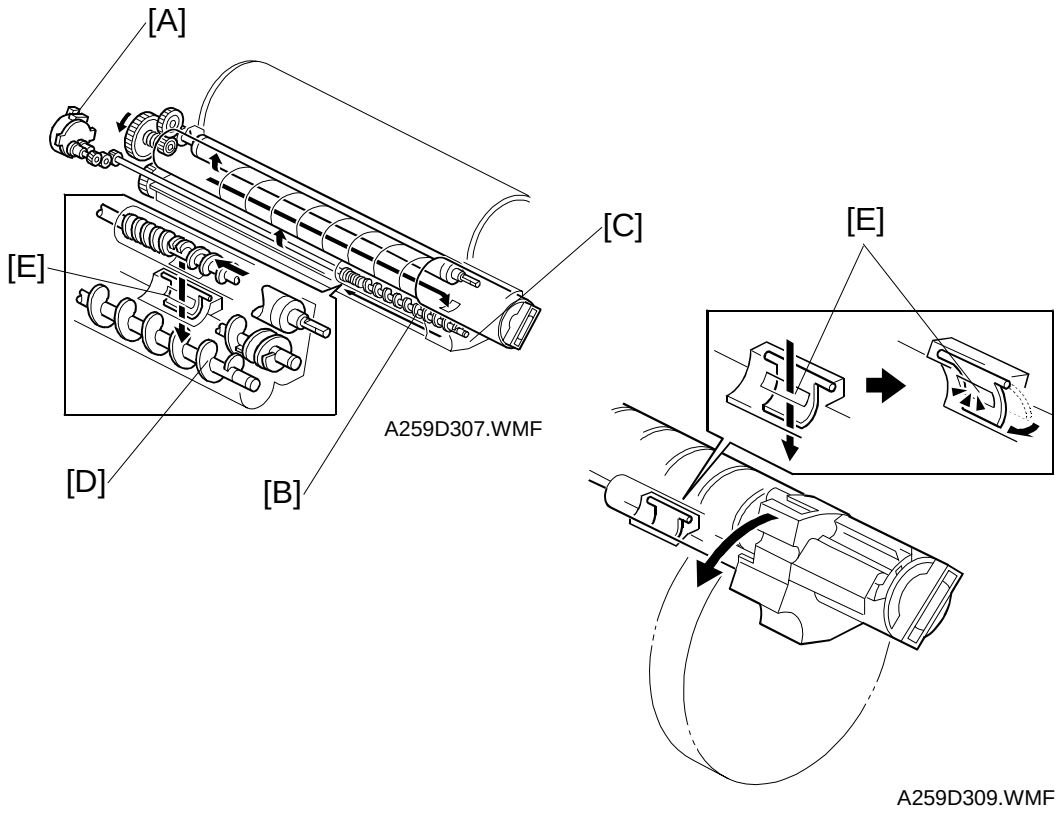
In this model, there is both ac and dc bias. The ac bias improves toner transfer to the drum.

- AC: Peak-to-peak 1.4 kV, 2 kHz
- DC: Center - 500V (depending on the process control self check)

At the beginning and end of revolver rotation, the ac bias is turned off to prevent toner from transferring to the drum, and only the dc bias is applied.

SC360: Development bias (high-voltage power supply – B) error

Toner Supply Mechanism



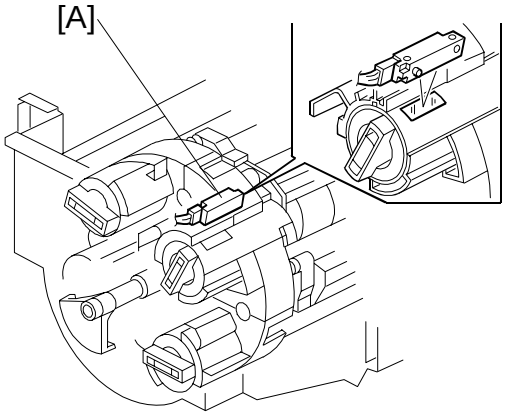
The toner supply motor [A] supplies toner in the development unit that is at the development position via gears that are behind the supply auger [B].

Toner is fed forward as the toner bottle rotates, and it falls into the toner supply section [C]. The supply auger [B] transfers the toner in the toner supply section [C] to the development unit [D].

The development shutter [E] in the development unit closes under its own weight when the revolver rotates, preventing toner backflow.

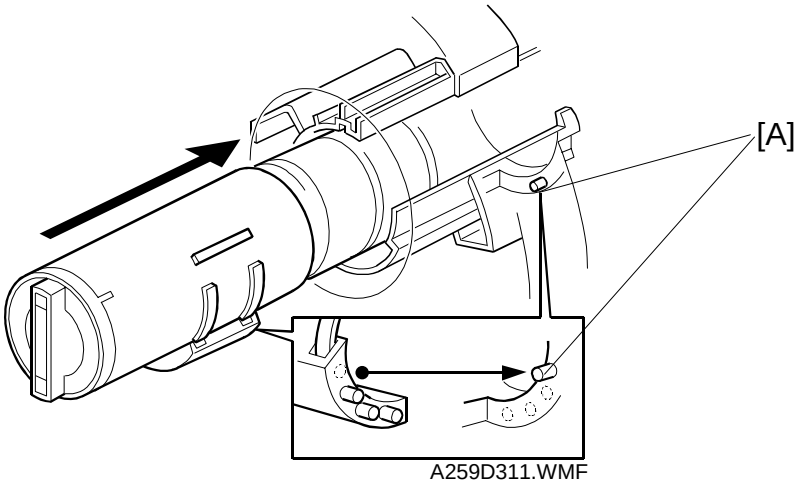
For more details on toner supply, see Toner Supply Control earlier in this section.

Toner Cartridge Detection



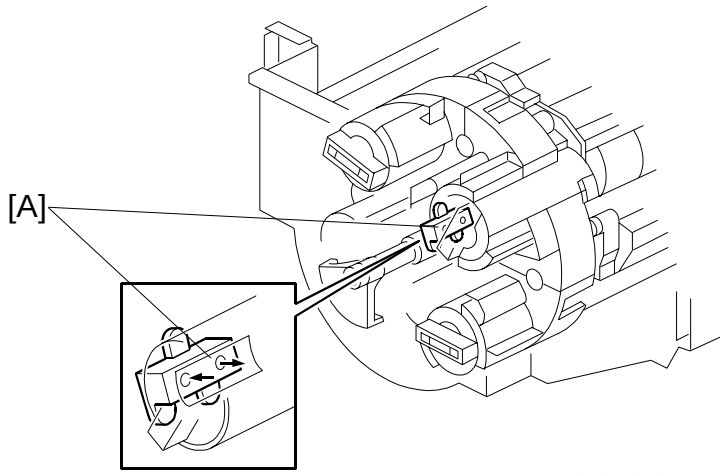
The toner cartridge sensor [A] detects the metallic mark on the toner bottle. This sensor is on the upper front side of the drawer unit.

Incorrect Toner Installation Prevention



Each toner cartridge has pins [A] to prevent it from being installed in the wrong place. The pins are at different positions for each color.

Toner End Detection



A259D313.WMF

Overview

There are two toner end detection mechanisms in this machine.

- Toner end sensor (C, M, and Y toners)
- ID sensor (K, C, M, and Y toners)

Black toner near-end is detected by the ID sensor only. For C, M, and Y, the machine detects near-end only if both the ID sensor and the toner end sensor detect it.

After entering the toner near-end condition, 10 more copies can be made before the machine enters a toner end condition. (Pixel count is also included in this process; for details see Toner Supply Control – Detecting Toner Near-end/End.)

Toner End Sensor

The toner end sensor [A] monitors the level of toner in the toner bottle through the reflective window in the toner feed hopper. If there is toner in the bottle, the path of light is blocked. The copier detects toner near end when the toner end sensor detects a low signal from the toner end sensor four consecutive times.

Black toner adhering to the window makes it difficult to detect the toner level in this way. Therefore, the ID sensor is used to detect black toner near-end.

ID Sensor

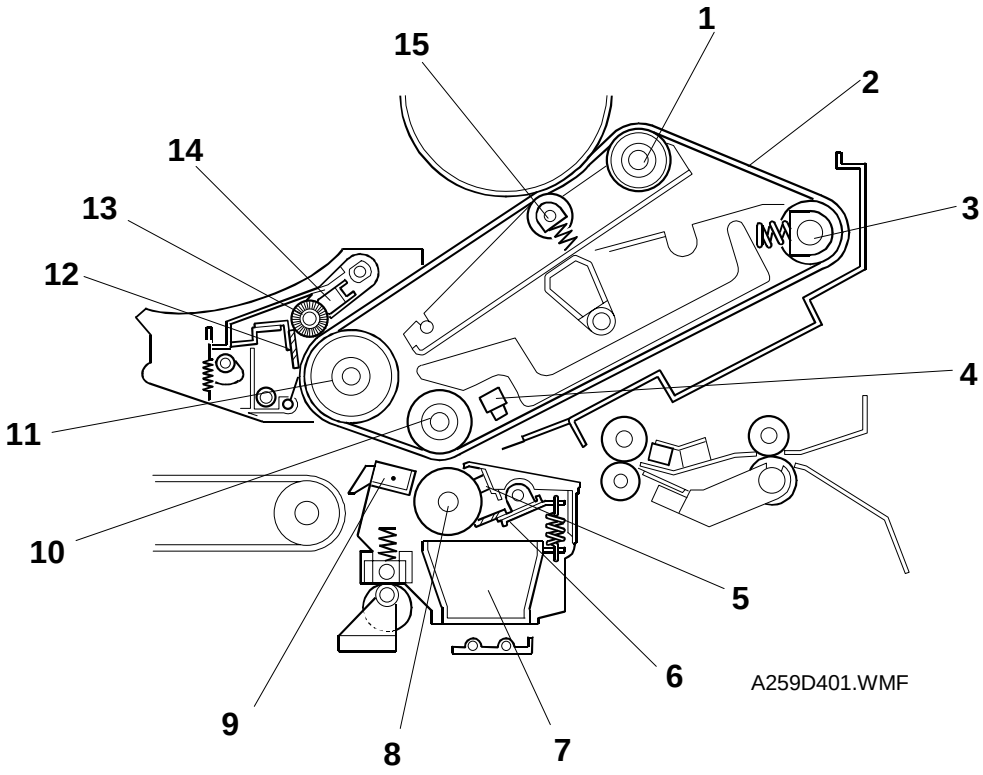
The copier displays a toner near end condition for the next and subsequent copies when the calculated toner during toner supply control Vsp detection is less than the target (0.4 mg/cm^2 for C, M, and Y toners, 0.3 mg/cm^2 for K toner) five times in a row.

For full details about toner near-end/end detection, see Toner Supply Control – Detecting Toner Near-end/End.

2.7 TRANSFER BELT UNIT

2.7.1 OVERVIEW

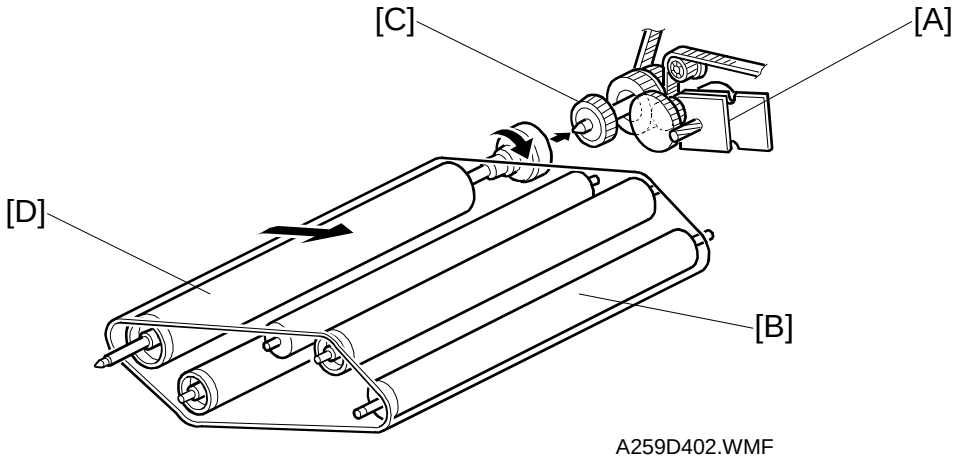
Each color toner is individually placed on the transfer belt, which in turn transfers the combined toner image to the paper.



1. Bias roller (transfer belt)
2. Transfer belt
3. Belt tension roller
4. Transfer belt home position sensor
5. Lubricant bar (paper transfer)
6. Cleaning blade (paper transfer)
7. Toner collection tray
8. Bias roller (paper transfer)
9. Paper separation corona unit
10. Paper transfer counter roller
11. Belt drive roller
12. Cleaning blade (transfer belt)
13. Lubricant brush
14. Lubricant bar (transfer belt)
15. Grounding roller

2.7.2 BELT TRANSFER MECHANISMS

Transfer Belt Drive

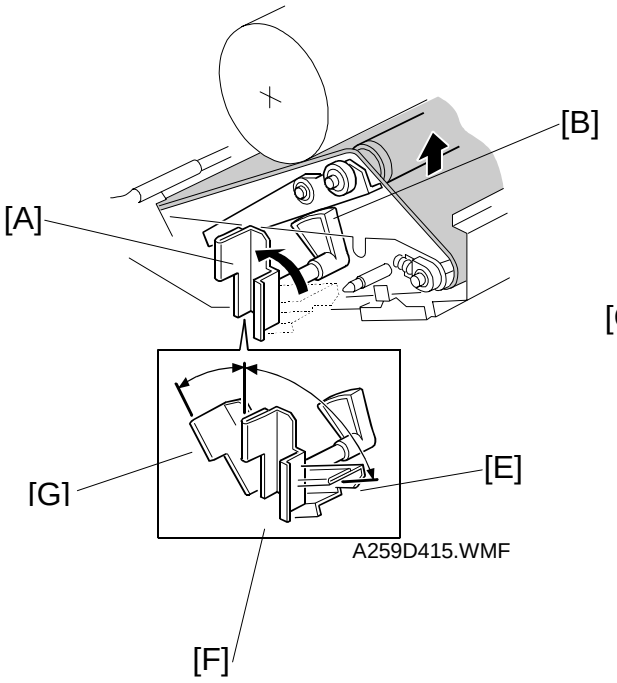


The drum motor [A] drives the transfer belt [B] via gears. The coupling gear [C] transfers drive from the motor to the belt drive roller [D] and secures the rear of the unit. The transfer belt is always in contact with the drum, and rotates in one direction only.

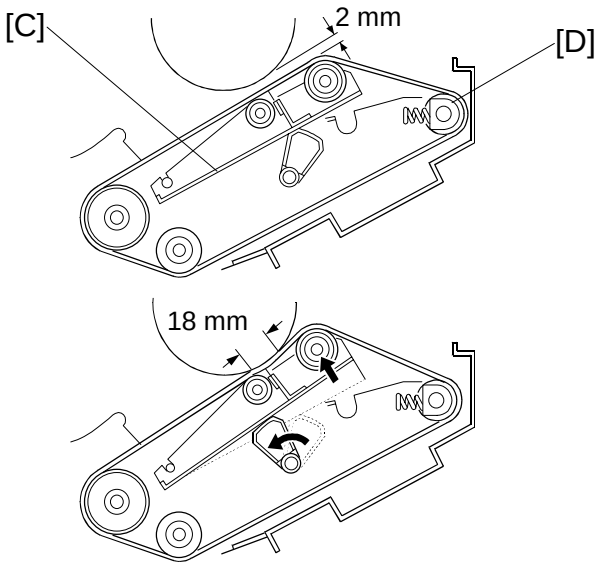
The speed of the transfer belt motor is reduced in OHP/thick paper or printer mode.

- Copier OHP/thick paper mode: The speed of the transfer belt is half of normal paper mode when transferring the image to paper.
- Printer output mode: The speeds of the drum, transfer belt, paper feed, and fusing sections are all reduced to 2/3 of the normal paper mode speed. This is at all times, not just during paper transfer.
- Printer OHP/thick paper mode: The speed of the transfer belt goes down to half the normal paper mode speed for copying during paper transfer.

Transfer Belt Release Lever



A259D415.WMF



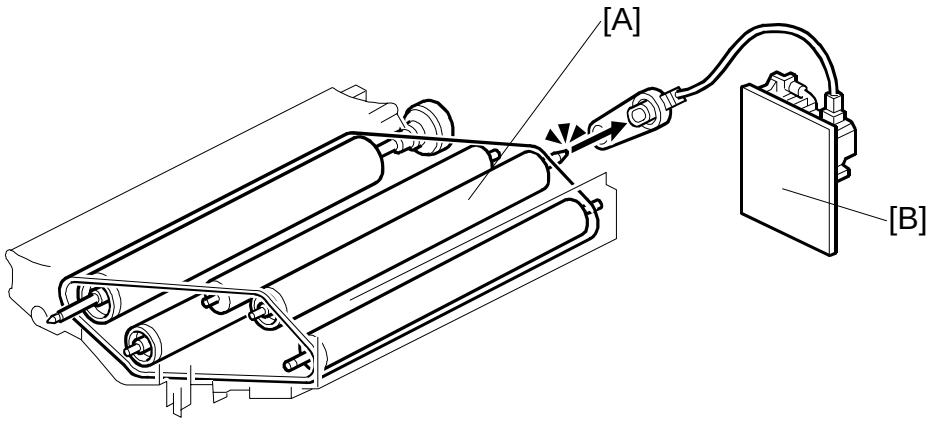
A259D403.WMF

The transfer belt unit has a release lever [A] at the front. This is because the transfer belt always contacts the drum during copying (the nip band width is about 18 mm), but must be moved away from the drum to remove the transfer belt unit.

Moving the release lever rotates the release lever cam [B]. The tension bracket [C] and tension roller [D] are moved by the cam, and this makes a gap of about 2 mm between the drum and the transfer belt.

There are three pressure release lever positions: transfer belt unit install/uninstall [E] (this is also the shipping position), drum contact [F], and transfer belt replacement [G].

Belt Transfer Bias



A259D404.WMF

The belt transfer bias mechanism uses a bias roller [A] to minimize the toner scattering around the transfer belt (scattering is reduced because lower voltages are used in this type of system than with a corona wire transfer system).

The high voltage supply board – T1, PCC [B] applies a voltage to the transfer belt through the bias roller, which is inside the transfer belt.

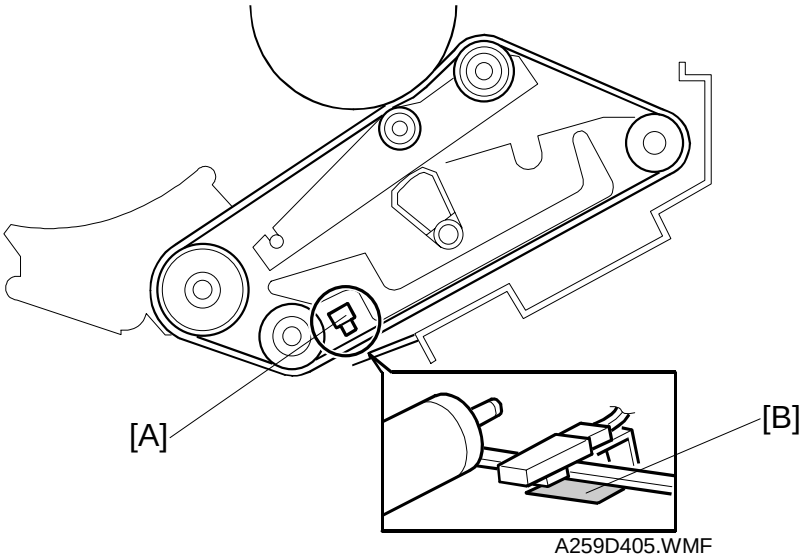
Color toners are superimposed on the transfer belt one at a time. The transfer voltage is increased as they are superimposed.

The transfer voltage is reduced between images to prolong the life of the belt cleaning unit (less dust and loose toner is attracted to the belt between images).

In the printer mode, the speed of the belt is reduced by 2/3, so the transfer voltage is adjusted to a value that matches the belt speed.

SC400: Belt transfer bias PP (high-voltage power supply: T1, PCC) error

Belt Mark Detection

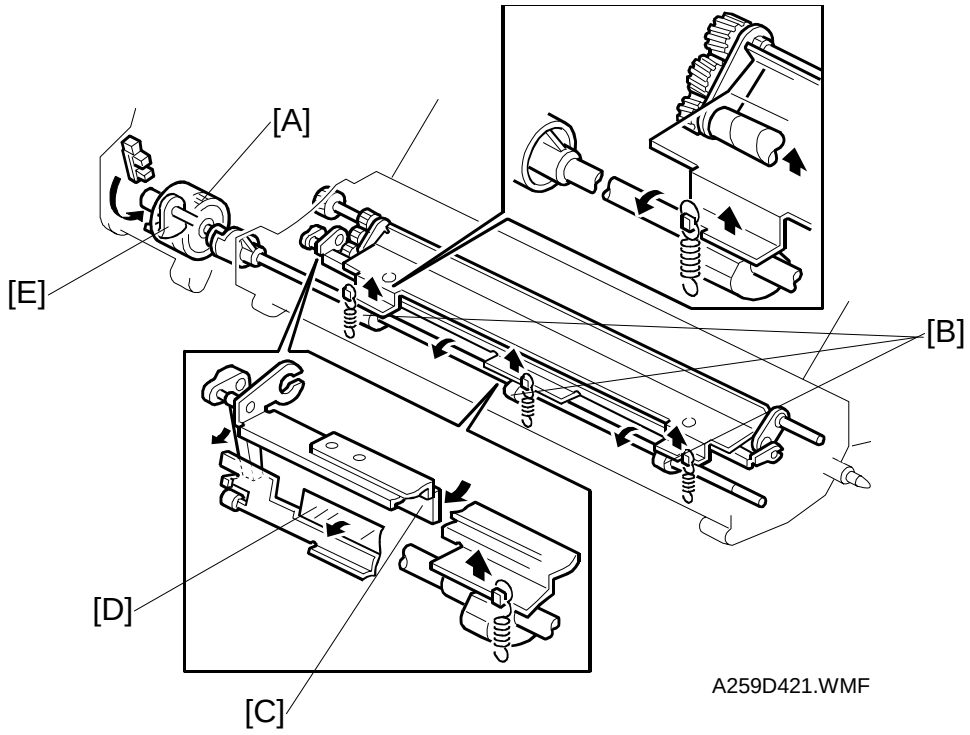


The machine uses the transfer belt home position sensor [A] to align the position of the image on the belt for each color by detecting the belt mark [B].

The FGATE signal is generated when the belt mark is detected, and this signal allows image data to be written to the drum.

SC452 is generated when the copier fails to detect the belt mark at the required time.

Transfer Belt Cleaning Mechanism



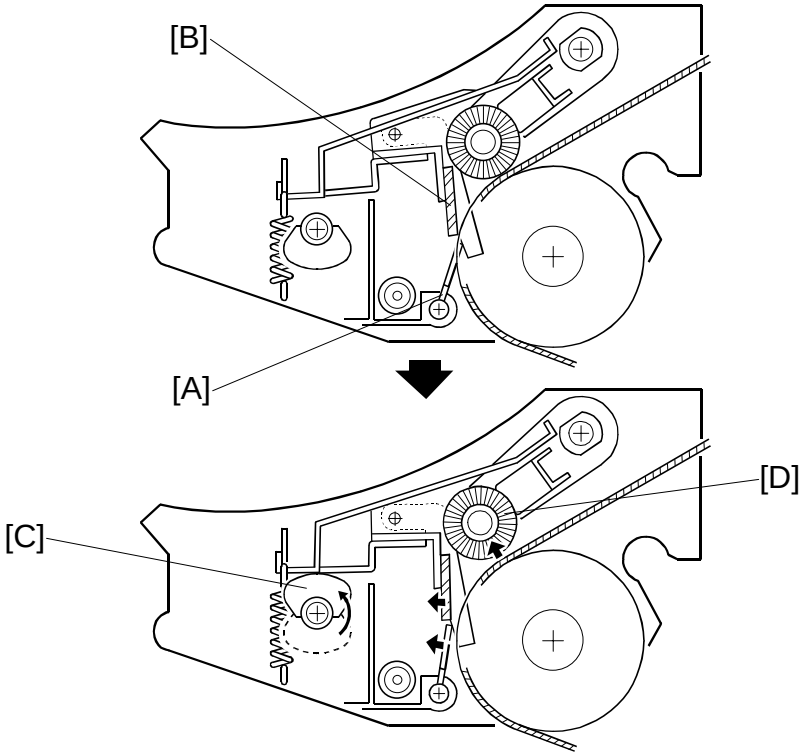
(1) Contact/release mechanism

At the end of a copy job, the belt cleaning clutch [A] (a half-turn clutch) transfers drive from the fusing motor to the belt cleaning cams [B] in the cleaning unit. These cams move the cleaning blade [C], the entrance seal [D], and the lubricant brush into contact with the transfer belt.

(2) Contact/release detection

The blade contact state is detected when the actuator [E] on the half-turn clutch enters the belt cleaning HP sensor.

If the actuator is not detected at the end of a copy job, SC457 (transfer belt cleaning unit position error) is generated and the copier stops.



A259D420.WMF

(3) Contact/release timing

The entrance seal [A] contacts the belt before the cleaning blade [B]. This prevents toner from falling onto the paper. The inlet seal contact/release ever [C] controls the contact and release timing of these components.

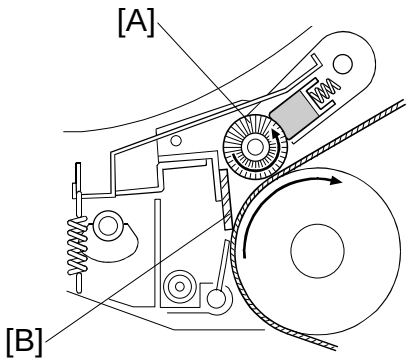
The lubricant brush [D] makes contact and releases at the same time as the blade.

(4) Dirty leading edge prevention

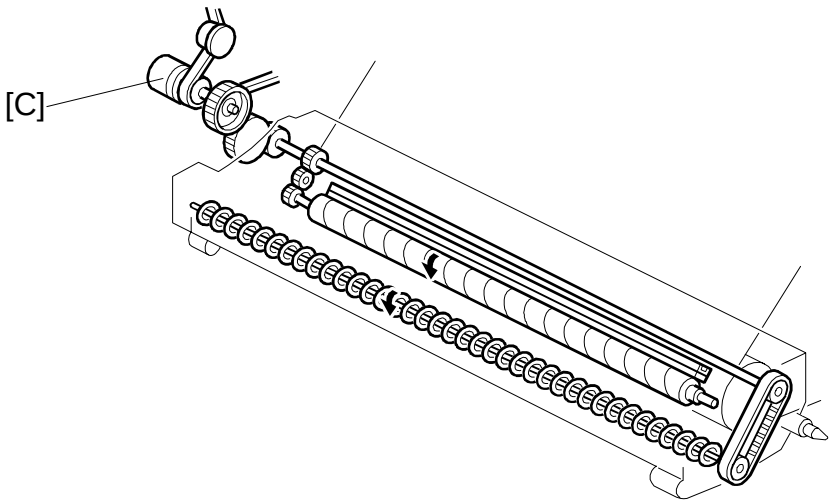
In 1C mode, the blade always contacts the transfer belt, so toner may build up on the edge of the blade.

The belt cleaning mechanism performs two contact/release operations at the end of a 1C-copy job to remove the toner accumulated at the edge of the blade. If toner builds up on the blade, it will fall onto the belt when the blade contacts the transfer belt. As a result of the timing of the mechanism, this toner appears at the leading edge of the copy.

(5) Belt lubricant mechanism



A259D419.WMF



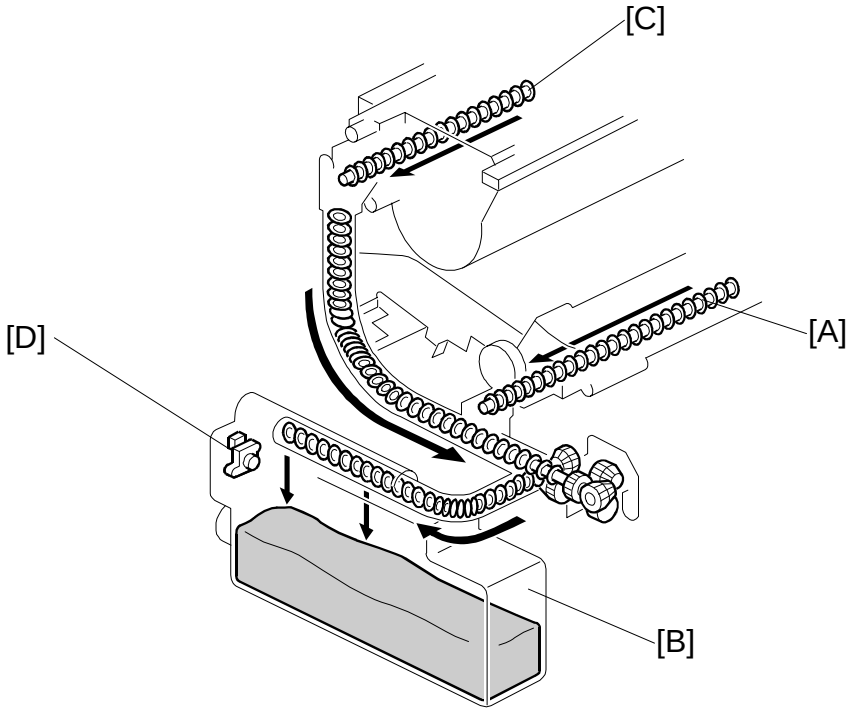
A259D422.WMF

Normal machine use generates a film of toner on the belt. Toner filming reduces the ability of toner to separate from the belt. To solve this problem, the lubricant brush [A] applies a small amount of lubricant to the transfer belt.

The lubricant brush applies lubricant to the transfer belt when the blade [B] comes in contact with the transfer belt.

The drum motor drives the lubricant brush through the belt lubricant clutch [C].

(6) Toner collection mechanism



A259D408.WMF

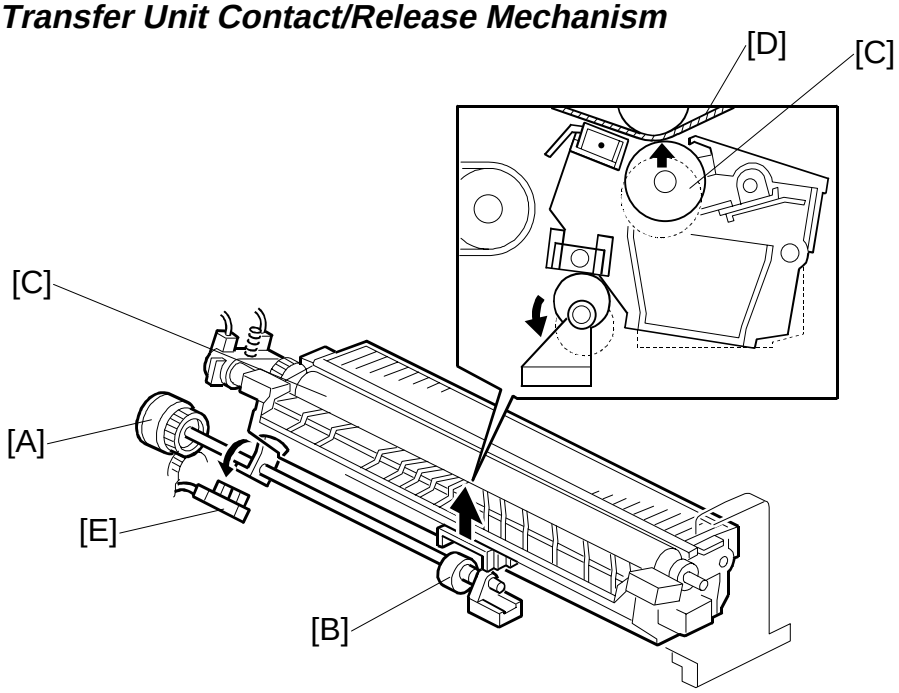
In the transfer belt unit, the toner collection coil [A] at the front of the transfer belt unit transports the toner removed from the transfer belt cleaning unit to the used toner tank [B].

In the drum area, the toner collection coil [C] in the drum cleaning unit transfers the toner removed from the drum cleaning unit to the used toner tank.

The used toner sensor [D] (a piezoelectric sensor) is inside the used toner tank. After this sensor detects that the tank is full, the used toner lamp on the operation panel blinks. Then, after 100 copies, the machine stops the copy job.

2.7.3 PAPER TRANSFER MECHANISM

Paper Transfer Unit Contact/Release Mechanism



A259D416.WMF

General Mechanism

When the paper is about 10 mm before the paper transfer nip, the paper transfer positioning clutch [A] (a half-turn clutch) turns on, rotating the paper transfer cam [B] by half a turn. This elevates the paper transfer unit, causing the paper transfer bias roller to contact the transfer belt. The nip band width between paper transfer bias roller [C] and transfer belt [D] is about 2 mm.

When the paper transfer bias roller contacts the transfer belt, the actuator enters the paper transfer home position sensor [E] (at the rear of the copier, behind the paper transfer unit).

When paper transfer ends, the paper transfer positioning clutch turns on again to rotate the paper transfer cam a half turn, which releases the paper transfer bias roller from the transfer belt.

If a paper transfer home position sensor error occurs, SC456 (paper transfer unit set error) appears on the LCD and the copier stops.

2C and 4C modes

The paper transfer unit stays away from the transfer belt until it is time to transfer the accumulated toner image to the paper.

Double-page transfer mode

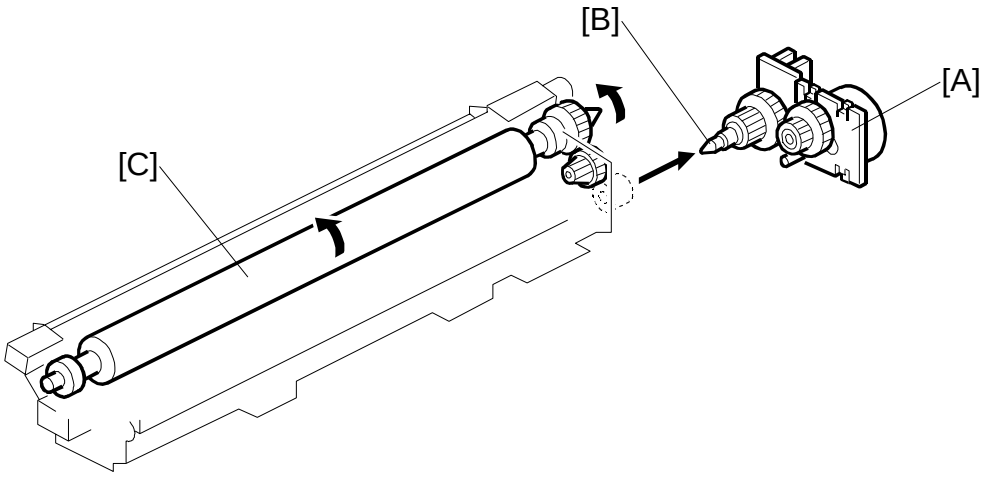
For certain smaller paper sizes (A4/LT or smaller), two pages are transferred to the transfer belt at the same time.

The machine generates an ID sensor pattern between every page. Therefore, there is one between the two images in double page transfer mode. Because of this, the paper transfer bias roller separates from the transfer belt between the images so that the pattern will not adhere to the paper transfer roller. When the ID sensor pattern has passed over, the paper transfer bias roller comes back into contact with the transfer belt.

1C (K, Y, C, M) mode

The bias roller always stays in contact with the transfer belt. In between the images, however, the voltage is at 0 to prevent scattered toner on the belt from adhering to the paper transfer roller.

Paper Transfer Bias Roller Drive



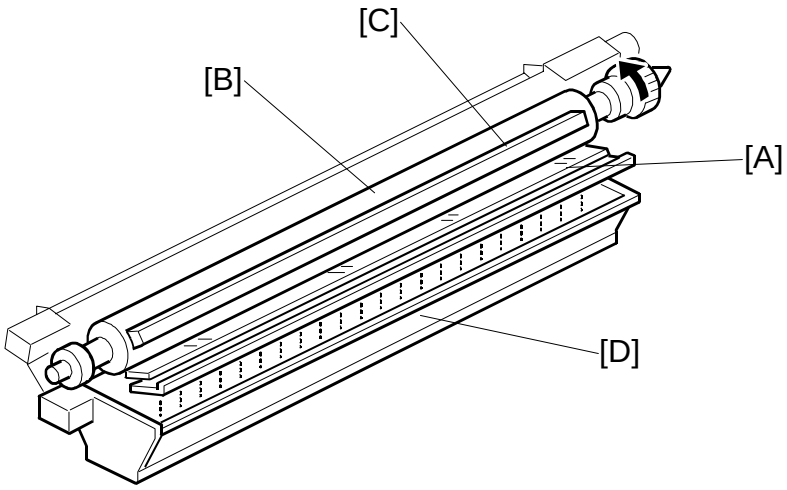
A259D414.WMF

The paper feed motor [A] drives the paper transfer bias roller through some gears.

The paper transfer assembly pivots about pin [B] when it moves into contact with or away from the belt. This means there is no connection/disconnection between the paper transfer unit and the paper feed motor, and this prevents shock generated by the contact or release of the unit from being conveyed to the transfer belt.

This also means that the bias roller [C] always rotates when the paper feed motor is on, even when the copier is not doing a paper transfer operation.

Paper Transfer Bias Roller Cleaning



A259D417.WMF

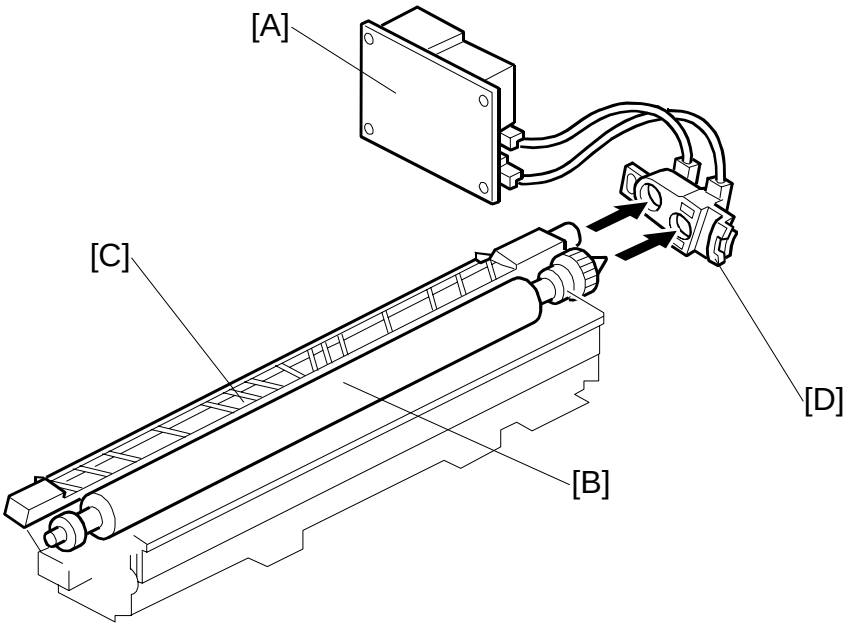
The cleaning blade [A] scrapes off the toner on the paper transfer bias roller [B]. To improve cleaning efficiency, spring plates press the lubricant bar [C] against the bias roller and the bar applies lubricant to the bias roller.

The toner collection tray [D] under the paper transfer unit stores the paper dust and toner scraped off by the blade.

Paper Transfer Bias

In this machine, paper transfer voltage is applied using a bias roller and constant current. The high voltage supply board – T2, D [A] applies bias voltage to the paper transfer bias roller [B] and the paper separation corona unit [C].

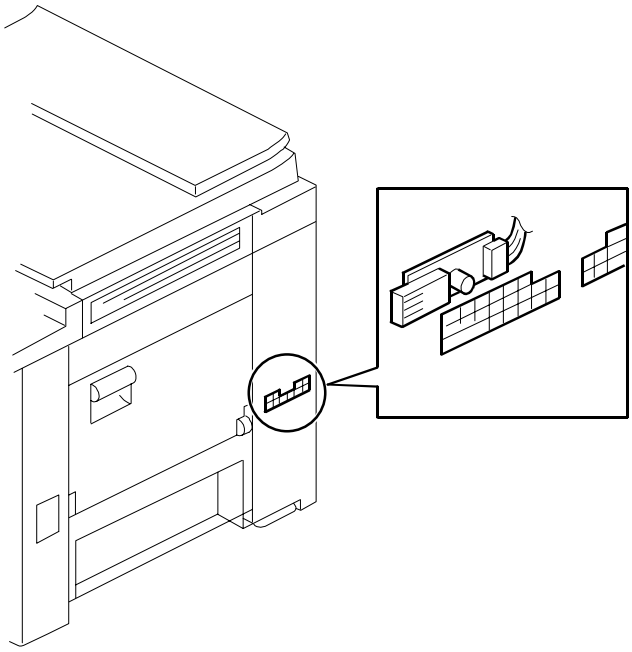
The bias terminal [D] moves up and down while the transfer unit repeats the contact/release operations, so it always remains connected.



A259D411.WMF

The machine changes the paper transfer current, depending on the following six parameters:

1. Absolute humidity
   Under low temperature/low humidity conditions, the current depends on the absolute humidity. The temperature and humidity sensors at the rear of the machine (see the diagram on the next page) measure absolute humidity.
2. Paper size
   Since a constant-current system is used to generate the paper transfer bias, the current is adjusted according to the paper size to compensate for the leak of current around the edges of the paper.
3. At the leading and trailing edges of the paper
   To prevent poor paper transfer at the leading and trailing paper edges, there are SP modes to change the current that is used within about 15 mm from the edges.



A259D413.WMF

4. Paper feed speed
   There are SP modes to adjust the current used for different paper types, such as OHP or thick paper.
5. Duplex mode: For the front and back sides of the paper
   There are SP modes to adjust the current used for the front and back sides of the paper.
6. Copy mode or printer mode
   There are SP modes to adjust the current used for these two modes.

SP2-310 (Set Paper Transfer Bias) sets the paper transfer bias values.

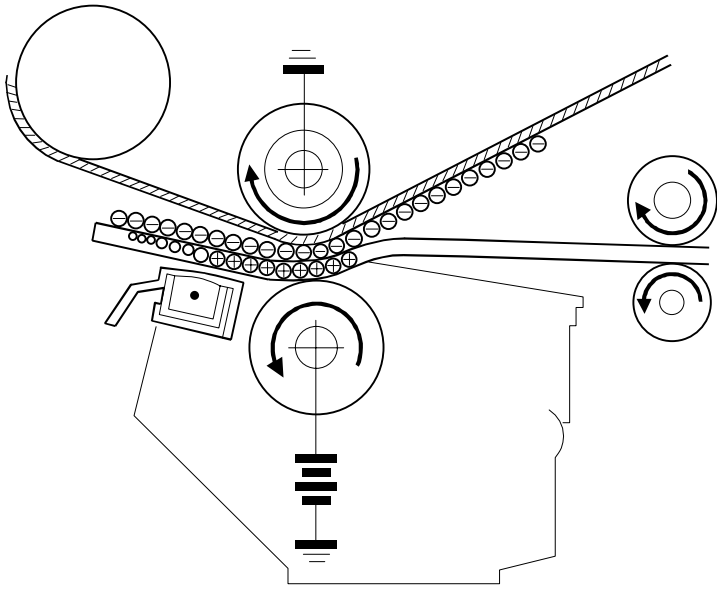
SP3-313 to 2-315: Corrections for paper type, paper size, leading edge, and trailing edge

SC450 (paper transfer bias power supply error)

SC495 (temperature sensor error)

SC496 (humidity sensor error)

2.7.4 PAPER SEPARATION MECHANISM



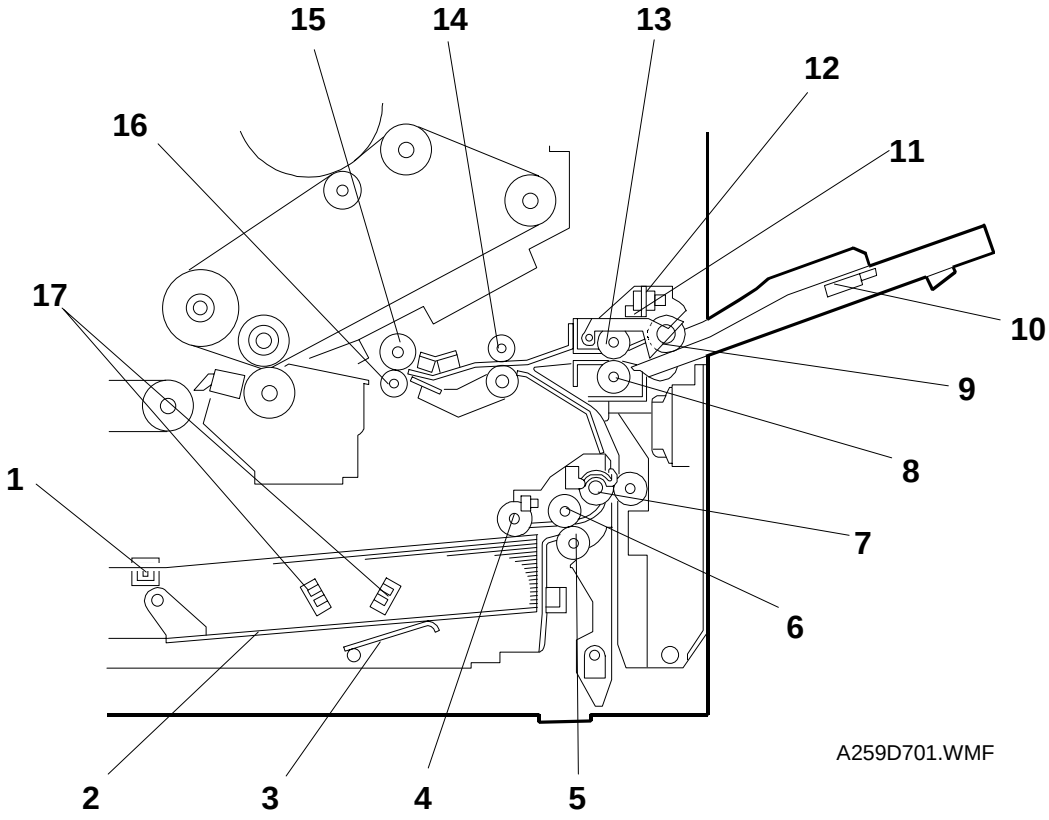
A259D412.WMF

The separation corona unit pulls the paper off the transfer belt. In addition, the paper separates from the belt as a result of the curvature of the belt.

The corona unit also improves copy quality at low humidity.

2.8 PAPER FEED AND REGISTRATION

2.8.1 OVERVIEW



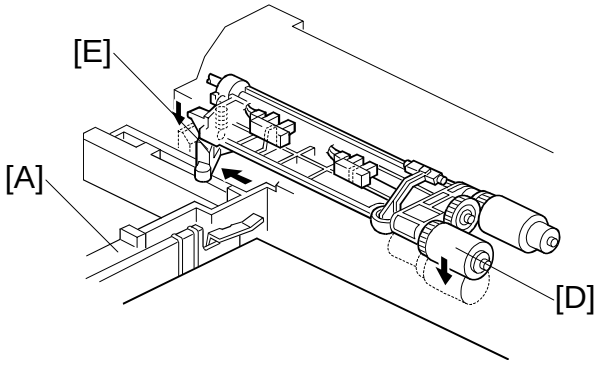
1. Paper tray detector switch
2. Tray bottom plate
3. Tray bottom plate lift arm
4. Tray pick-up roller
5. Tray separation roller
6. Tray paper feed roller
7. Relay roller
8. By-pass separation roller
9. By-pass pick-up roller
10. By-pass paper width detection board
11. By-pass paper end sensor
12. By-pass feed table switch
13. By-pass feed roller
14. Grip roller
15. Upper registration roller
16. Lower registration roller
17. Tray paper height sensors

2.8.2 PAPER TRAY

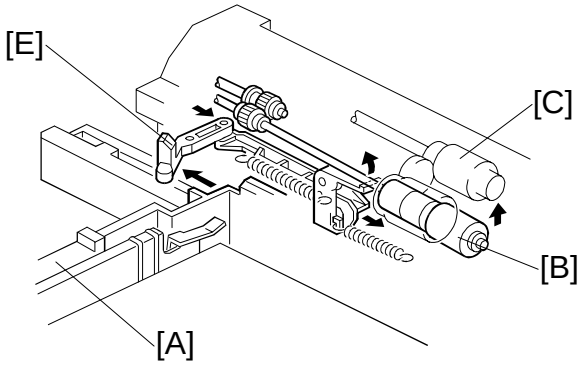
Paper Feed/Separation

The paper tray feed station uses a feed and reverse roller system. The paper feed unit is made up of a pick-up roller, a paper feed roller, a separation roller, and a relay roller. Behind the separation roller is a torque limiter.

Separation and Pick-Up Roller Release



A259D713.WMF

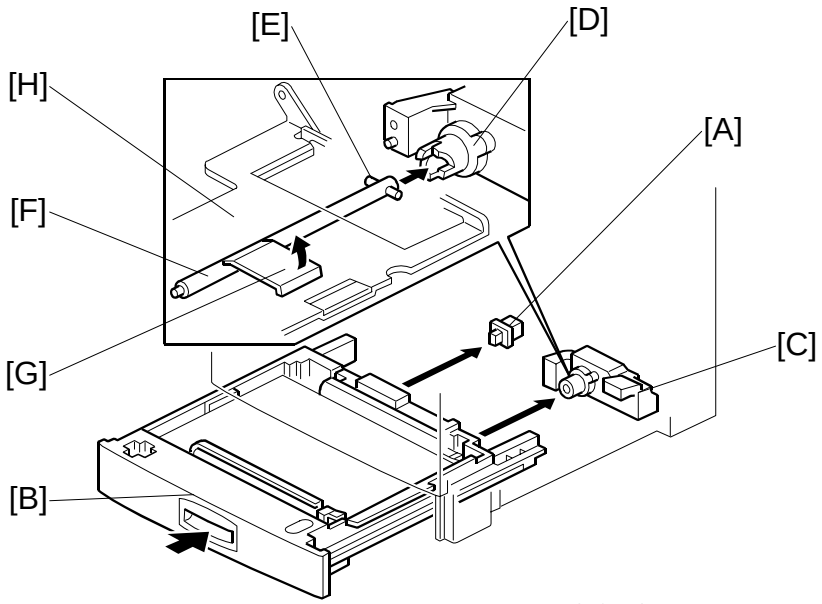


A259D714.WMF

When the paper tray [A] is not inside the machine, the separation roller [B] is away from the paper feed roller [C] and the pick-up roller [D] stays in the upper position.

When the paper tray is pushed into the machine, it pushes the release lever [E]. This causes the pick-up roller [D] to go down and the separation roller [B] to move up into contact with the paper feed roller.

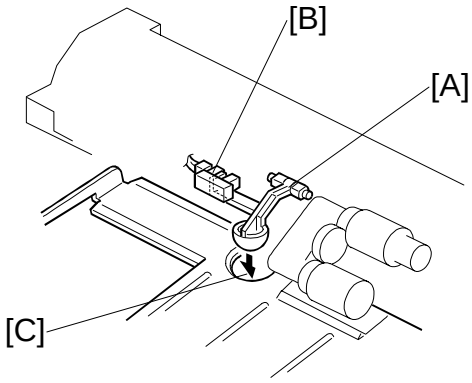
Paper Lift



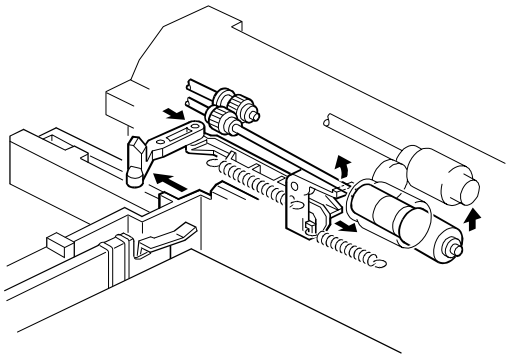
The paper tray detector switch [A] detects when the paper tray [B] is placed in the machine. When the machine detects that the paper tray is in the machine, the tray lift motor [C] turns on and the coupling gear [D] on the tray lift motor engages the pin [E] on the lift arm shaft [F]. Then the tray lift arm [G] lifts the tray bottom plate [H].

When the tray is pulled out, the coupling between the tray lift motor and the coupling gear is disengaged, causing the tray bottom plate to fall down under its own weight.

Paper End Detection



A259D716.WMF



A259D714.WMF

If there is some paper in the paper tray, the paper stack raises the paper end feeler [A] and the paper end sensor [B] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.

When the tray is pulled out, the pick-up roller is released, and this lifts the paper end sensor actuator to prevent it from being damaged while the tray is being pulled out.

Paper Size Setting

The paper sizes for all trays must be set with "User Tools/System Settings/Tray Paper Size." When changing a paper size, it is necessary to move the side and end fences as well as to change the default settings of this user tool.

The paper sizes are set at the factory as follows for all trays, including optional paper trays:

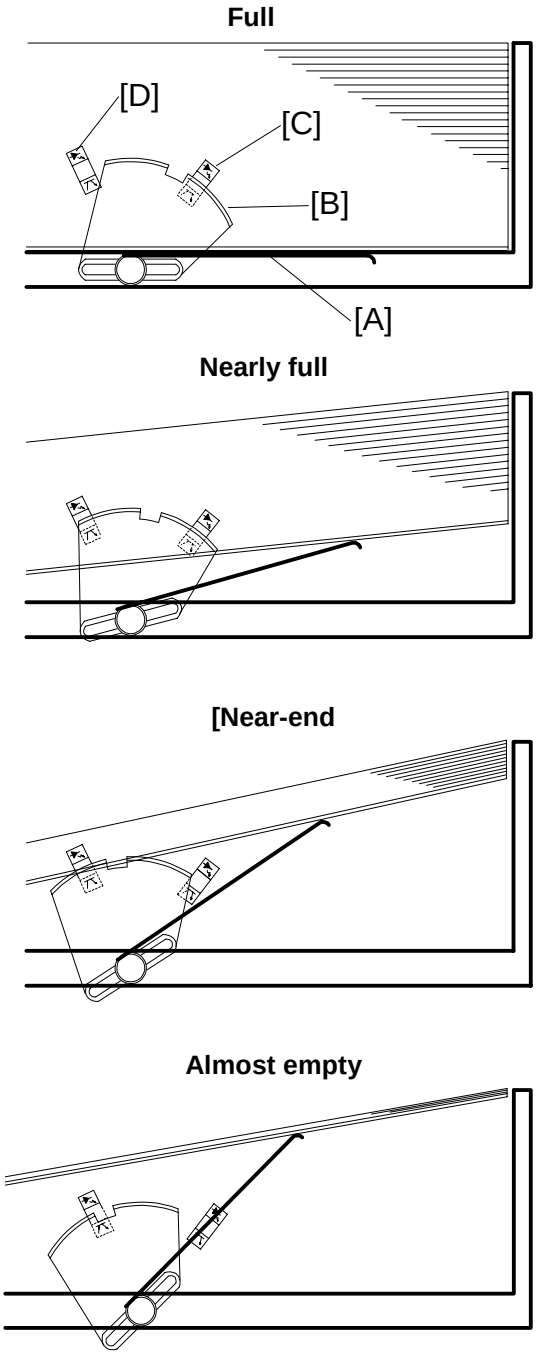
- Copier settings: A4 sideways
- Tray side fence position: A4 sideways

The end fence for each paper tray is stored at the factory at the front left of the tray. The customer must install it at the A4 sideways position, or set up the machine to use another paper size.

Tray Paper Height Sensor

This copier can detect the remaining volume of paper in the paper tray. However, there is no indication of this on the operation panel, and the sensors are only used by the printer controller so that the PC user can check how much paper is left.

As the remaining paper decreases, the tray lift arm [A] goes up, as does the sensor actuator [B], which is fitted on the same shaft as the tray lift arm. The relationship between the positions of this actuator and the tray paper height sensor signals is shown in the table below.

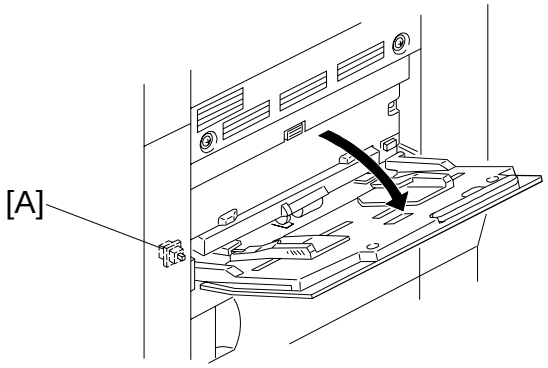


A259D534.WMF

Remaining Paper	Paper Height Sensor 2 [C]	Paper Height Sensor 1 [D]
Full	OFF	ON
Nearly full	ON	ON
Near-end	ON	OFF
Almost empty	OFF	OFF

2.8.3 BY-PASS TRAY

By-pass Table Mechanism

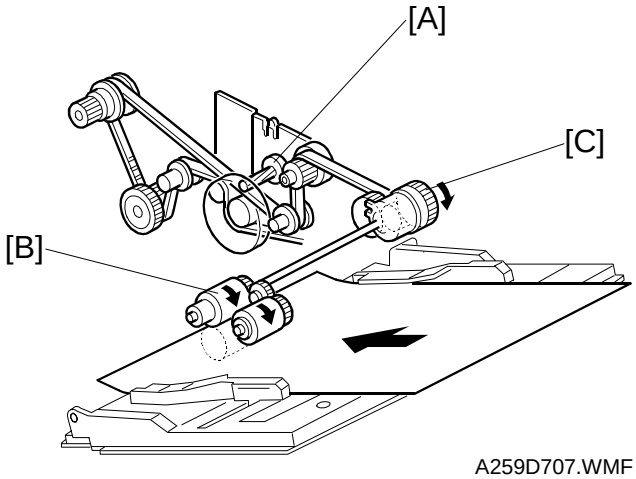


A259D604.WMF

The by-pass feed table switch [A] detects when the by-pass feed table is open. Then the CPU turns on the by-pass feed indicator on the operation panel.

The by-pass table can hold up to 50 sheets of paper.

Paper Feed/Separation

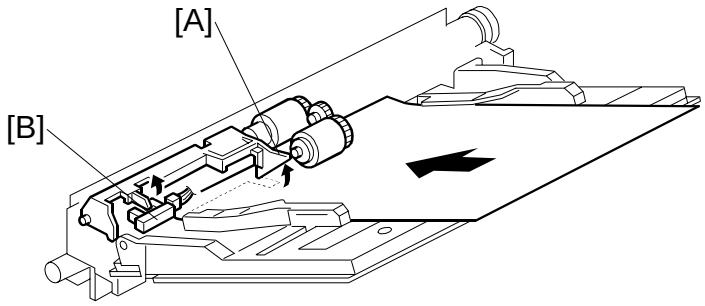


A259D707.WMF

The by-pass feed mechanism uses an FRR system.

The paper feed motor [A] drives the paper feed roller [B] via the by-pass paper feed clutch [C].

Paper End Detection

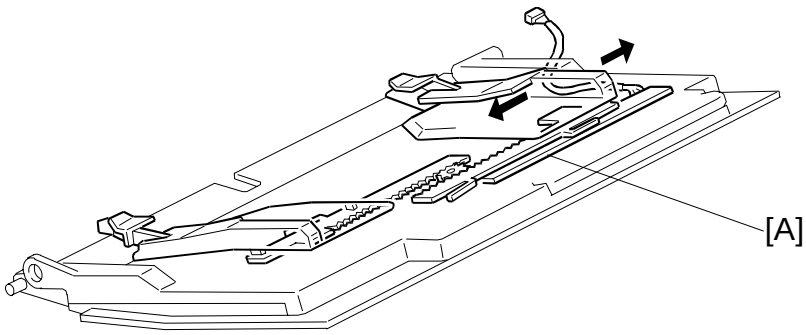


A259D708.WMF

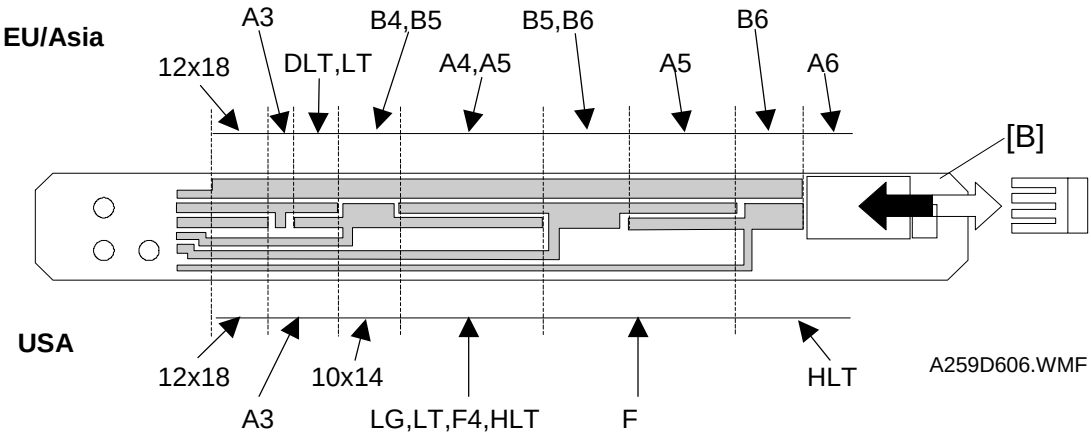
The paper end sensor actuator [A] is next to the pick-up roller. When there is paper in the tray, the paper lifts the actuator out of the by-pass paper end sensor [B].

When paper is all used up, the actuator falls on its own weight, entering the by-pass paper end sensor, and the machine detects that the tray is empty.

Paper Size Detection



A259D605.WMF



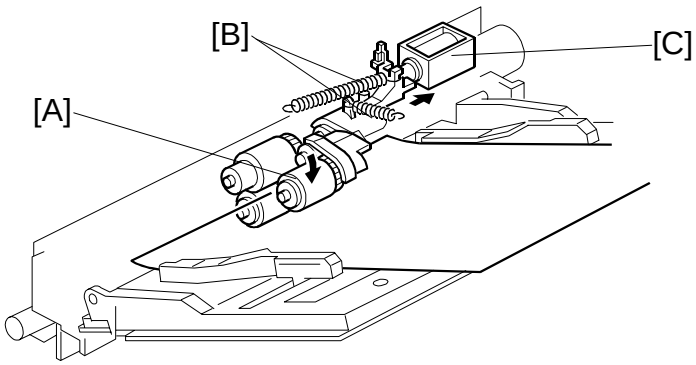
A259D606.WMF

The by-pass paper width detection board [A] monitors the paper width. The rear side fence is connected to the terminal plate [B]. When the side fences are being moved to match the paper width, the terminal plate slides along the wiring patterns on the detection board. The patterns for each paper width on the paper width detection board are unique. Therefore, the machine determines which paper width has been placed in the by-pass feed table by the signal output from the board.

This machine does not have a paper length sensor, so the paper length is selected by user operation when the by-pass feed table is open. (The user also selects the lengthwise/sideways orientation.)

The user also can select a non-standard paper size, but this must have been specified in advance with a user tool (default: 432 x 297 mm).

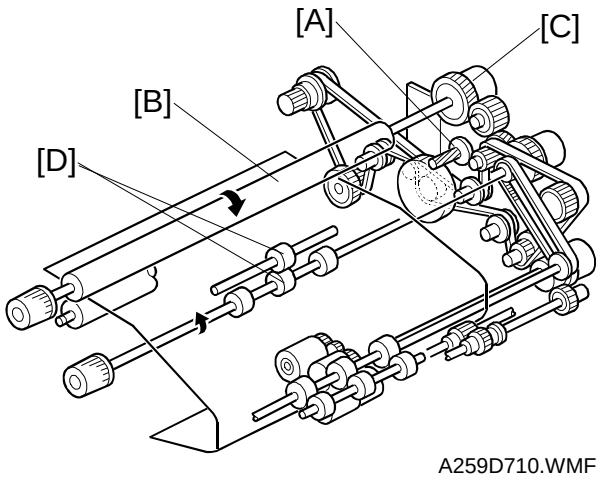
Pick-up Roller



A259D709.WMF

The pick-up roller [A] is normally held up by the springs [B] on the pick-up solenoid arm. When it is time to feed the paper, the pick-up solenoid [C] turns on, causing the pick-up roller to contact the paper.

2.8.4 REGISTRATION MECHANISM AND PAPER FEED DRIVE



A259D710.WMF

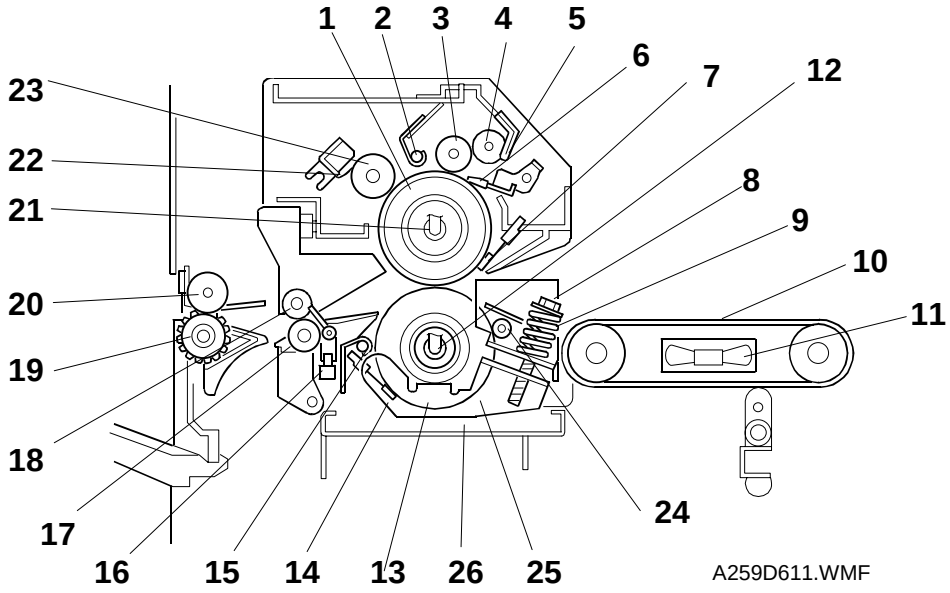
The paper feed motor [A] drives the upper registration roller [B] via the registration clutch [C], gears and timing belt.

The grip rollers [D] feed the paper to the registration rollers. They also ensure correct registration when the by-pass table is being used. Without these rollers, the paper would sag into the space below the feed path, and this would prevent the paper's leading edge from staying at the registration roller during registration.

The paper feed motor drives the other paper feed mechanisms motor via gears and a timing belt.

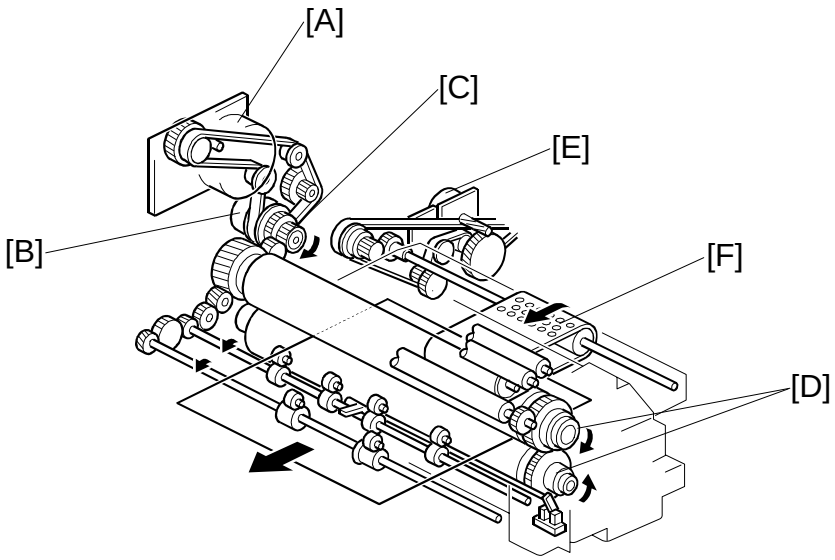
2.9 PAPER TRANSPORT, FUSING, AND PAPER EXIT

2.9.1 MAJOR COMPONENTS



1. Hot roller
2. Hot roller thermofuse
3. Oil supply roller
4. Oil supply sub-roller
5. Oil supply pad
6. Hot roller blade
7. Hot roller thermistor
8. Pressure screw
9. Pressure spring
10. Transport belt
11. Transport fan
12. Pressure roller fusing lamp
13. Pressure roller
14. Pressure roller thermistor
15. Pressure roller thermofuse
16. Paper exit sensor
17. Fusing exit roller
18. Fusing exit sub-roller
19. Exit roller
20. Exit sub-roller
21. Hot roller fusing lamp
22. Scraper
23. Hot roller cleaning roller
24. Pressure roller cleaning roller (US models only)
25. Pressure roller cleaning blade (Europe/Asia models only)
26. Pressure roller cleaning pad (Europe/Asia models only)

2.9.2 DRIVE MECHANISM



A259D612.WMF

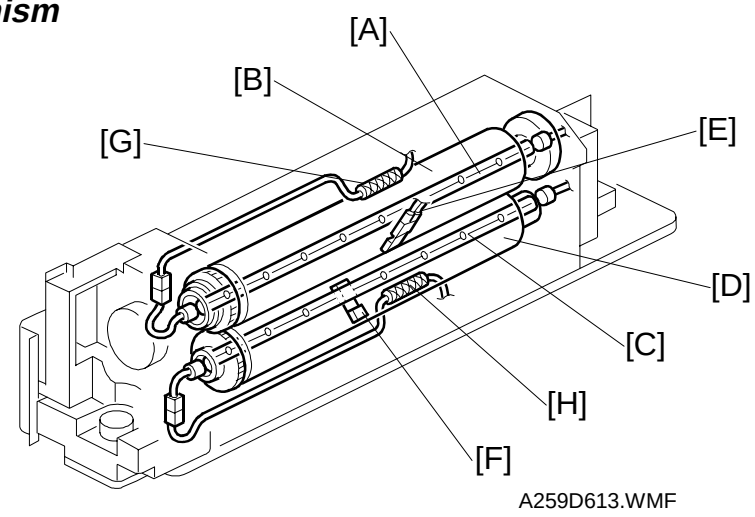
The fusing motor [A] drives the fusing and paper exit units. The fusing clutch [B] transmits drive to the fusing drive gear [C]. When the cpu detects that the front door is opened (by the signal from the front door switch), it turns off the clutch, which releases the drive gear [B].

There are also gears [D] at the front of the hot and pressure rollers to reduce creasing.

The paper feed motor [E] drives the transport belt [F].

2.9.3 FUSING UNIT

Fusing Mechanism



A259D613.WMF

The hot and pressure rollers each have a fusing lamp: 800 W [A] for the hot roller [B] and 400 W [C] for the pressure roller [D]. The hot roller thermistor [E] and pressure roller thermistor [F] control the temperature of these lamps.

Temperature control is accomplished normally by turning the fusing lamps on and off. Phase control can be selected using an SP mode (SP1-104).

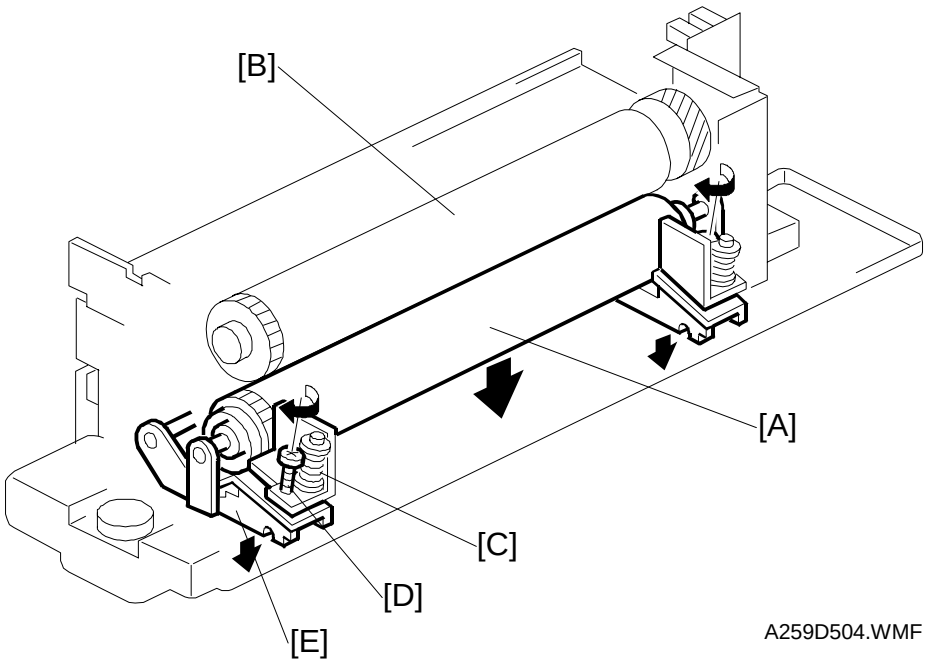
The hot roller thermofuse [G] blows at 184°C and the pressure roller thermofuse [H] blows at 167°C. These thermofuses prevent the temperature in the fusing section from rising to dangerous levels.

Fusing Temperature Control

The fusing temperature depends on the selected copy modes, as shown below. The defaults indicated in the table can be adjusted with SP modes.

State/Mode / Rollers	Stand-by Mode	Copy Mode			
		Normal		OHP/Thick Paper	
		Single Color	Full Color	Single Color	Full Color
Fusing: simplex, duplex side 1	165 °c	160 °c	165 °c	150 °c	160 °c
Fusing: , duplex side 2	165 °c	160 °c	165 °c	150 °c	160 °c
Pressure: simplex, duplex side 1	150 °c	150 °c		150 °c	
Pressure: , duplex side 2	150 °c	150 °c		150 °c	

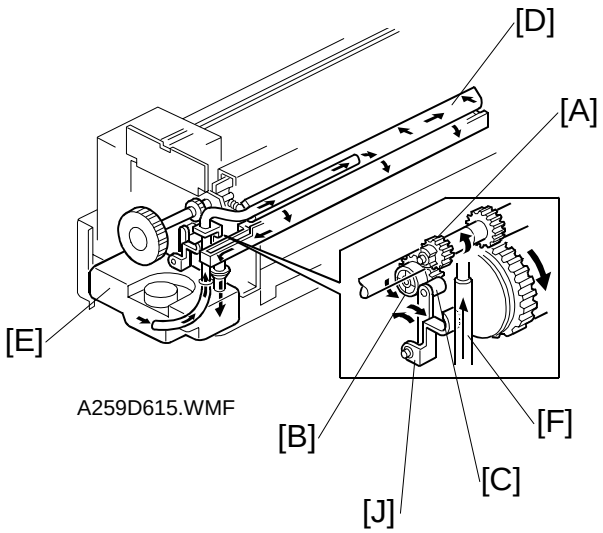
Fusing/Pressurization Mechanism



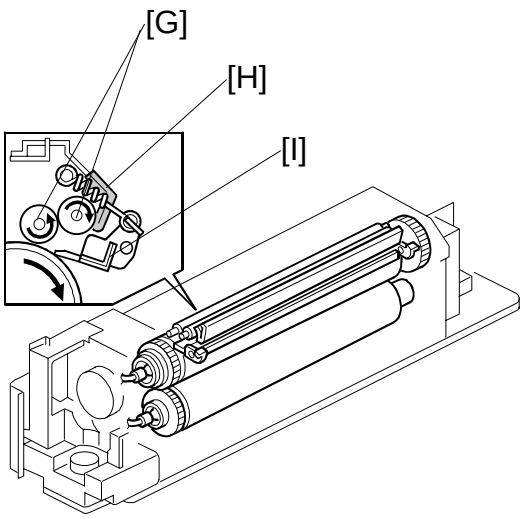
The hot and pressure rollers are silicone rollers. The oil supply mechanism makes it easier for paper to separate from the rollers after fusing.

Springs [C] and a bracket press the pressure roller [A] against the hot roller [B]. When disassembling the fusing unit, pressure between the rollers is released by unscrewing the pressure release screw [D] and lowering the pressure lever [E].

Oil Supply Mechanism



A259D615.WMF



A259D616.WMF

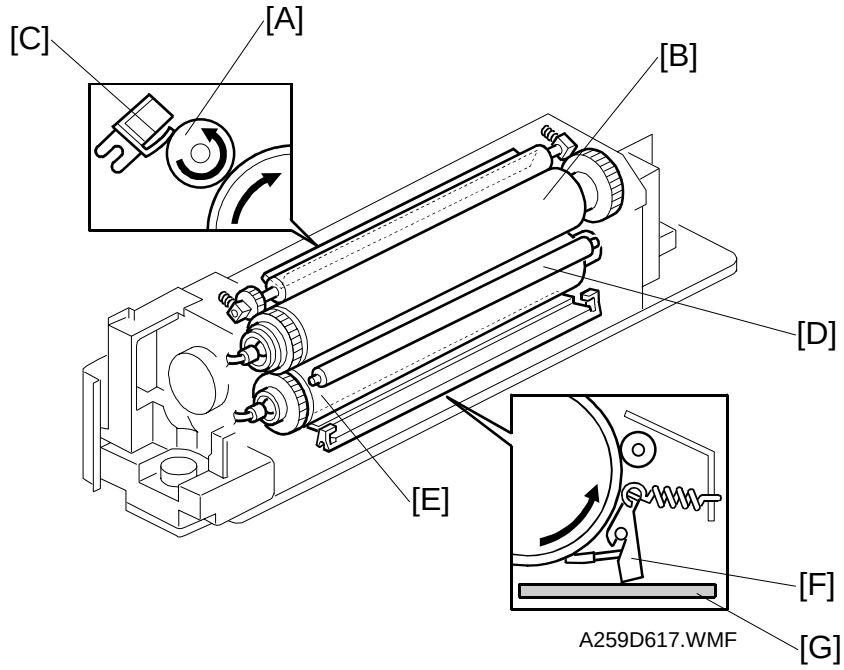
The gear [A] and cam gear [B] on the fusing knob shaft at the front of the fusing unit are always engaged. The actuator [C] for the oil pump roller is in contact with this cam gear.

When the fusing drive gear rotates causing the fusing knob to rotate, the gear and cam gear on the fusing knob shaft rotate. This rotates the roller of the actuator following the cam about pin [J], thus pressing the oil pump sleeve [F] to supply oil to the oil supply pad [D]. Excess oil is collected in the oil tank [E].

At both ends of the oil pump sleeve [F] are valves, which prevent oil from flowing back.

The oil supply roller [G] copier applies oil to the hot roller by pressing the oil supply pad [H] against the supply roller. The fusing oil blade [I] prevents oil from being applied unevenly.

Cleaning Mechanism



The cleaning roller [A] cleans the hot roller [B]. Toner and dust on the hot roller adheres to the cleaning roller. Then the scraper [C] scrapes off the toner and dust on the cleaning roller.

– US models –

The pressure roller cleaning roller [D] cleans the pressure roller [E].

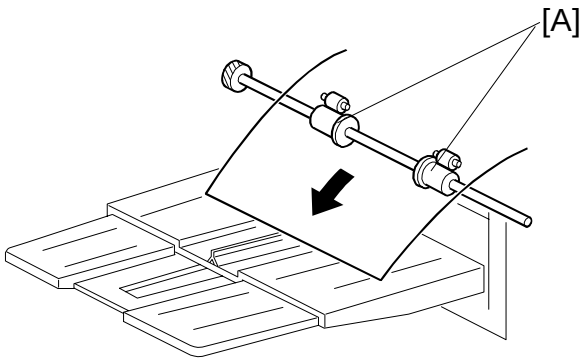
– European/Asian models –

The pressure roller blade [F] removes paper dust from the pressure roller [E].

To prevent the pressure roller from catching on the blade, there is a pressure roller pad [G] under the pressure roller.

2.9.4 INVERTER AND PAPER EXIT MECHANISMS

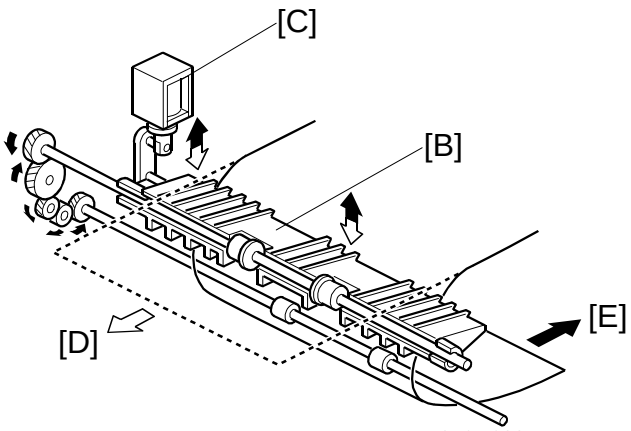
Paper Exit



A259D601.WMF

The paper exit roller [A] suppots the paper fed from the fusing unit to improve the ability of the paper to stack.

Junction Gate Mechanism (A259/A260 Only)

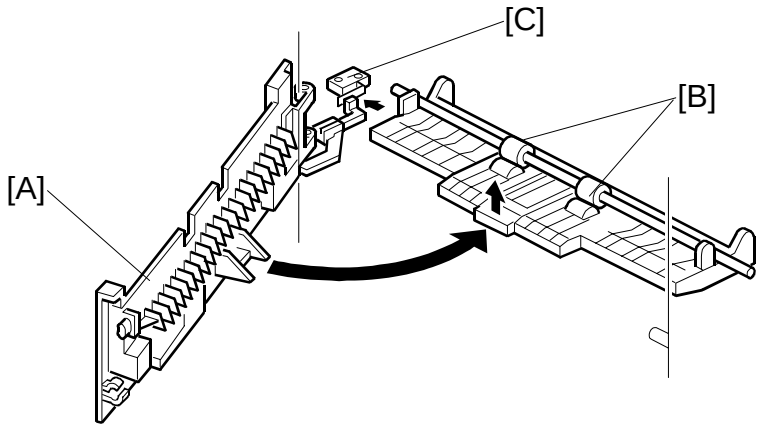


A259D602.WMF

After fusing, the junction gate [B] feeds paper either to the paper exit tray or the inverter and duplex tray. The junction gate solenoid [C] controls the junction gate as follows.

- To feed paper to the paper exit tray [D]: The junction gate solenoid is off.
- To feed paper to the duplex tray [E]: The junction gate solenoid is on

Paper Exit Door Mechanism (A259/A260 Only)



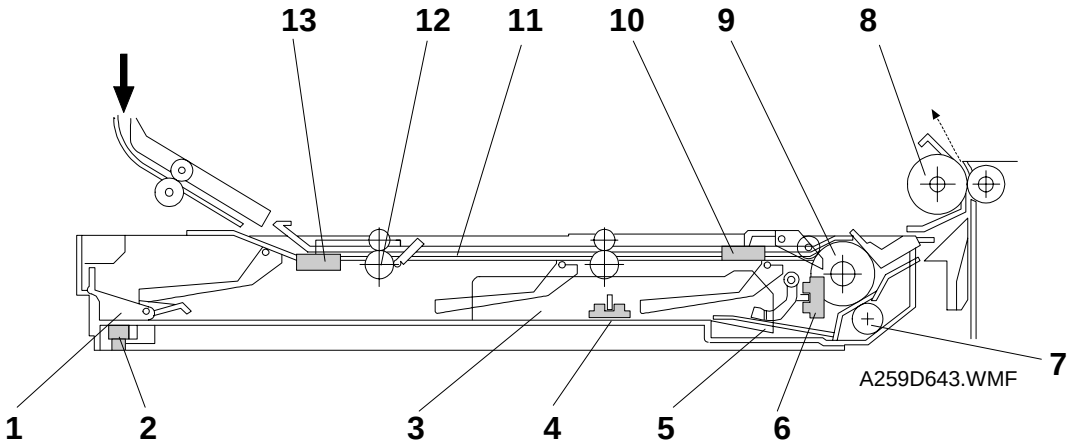
A259D603.WMF

The paper exit door [A] opens to help remove paper jams in the inverter. The relay rollers [B] are released when the paper exit door opens.

The paper exit door switch [C] detects whether the paper exit door is open or closed.

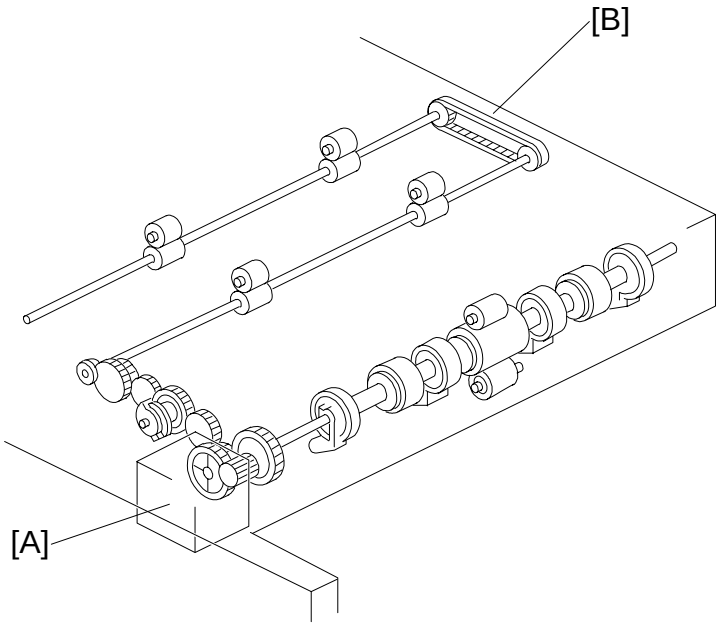
2.10 DUPLEX TRAY (A259/A260 COPIERS ONLY)

2.10.1 OVERVIEW



1. End fence
2. End fence jogger H.P. sensor
3. Side fence jogger
4. Side fence jogger H.P. sensor
5. Bottom plate
6. Duplex paper end sensor
7. Separation roller
8. Vertical transport roller
9. Paper feed roller
10. Duplex turn sensor
11. Transport path
12. Duplex entrance roller
13. Duplex entrance sensor

2.10.2 DRIVE MECHANISM



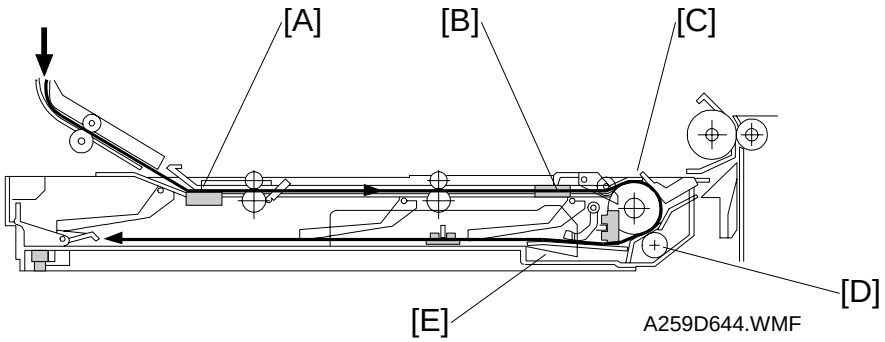
A259D667.WMF

The duplex feed motor [A] drives all the rollers in the duplex tray using a series of gears and a timing belt [B]. Helical gears are used to reduce noise. The duplex feed motor also drives the duplex bottom plate up and down.

2.10.3 PAPER FEED INTO THE DUPLEX TRAY

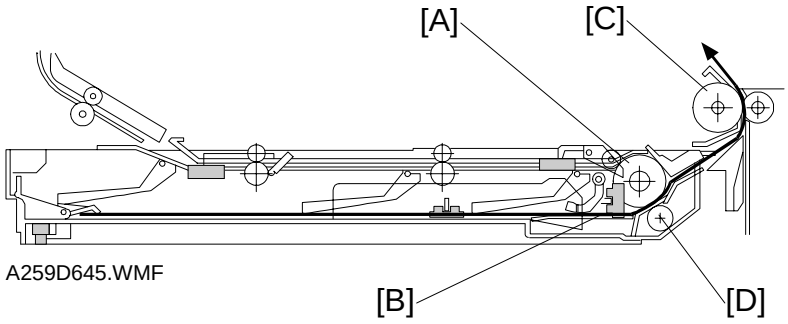
The duplex feed motor is a stepper motor. The direction that the motor turns depends on whether the duplex unit is stacking or feeding.

1. Duplex Stacking



Paper enters the duplex unit passing the entrance sensor [A], the duplex turn sensor [B], the paper feed roller [C], and the separation roller [D]. Then, it is stacked while the bottom plate [E] is in the lower position.

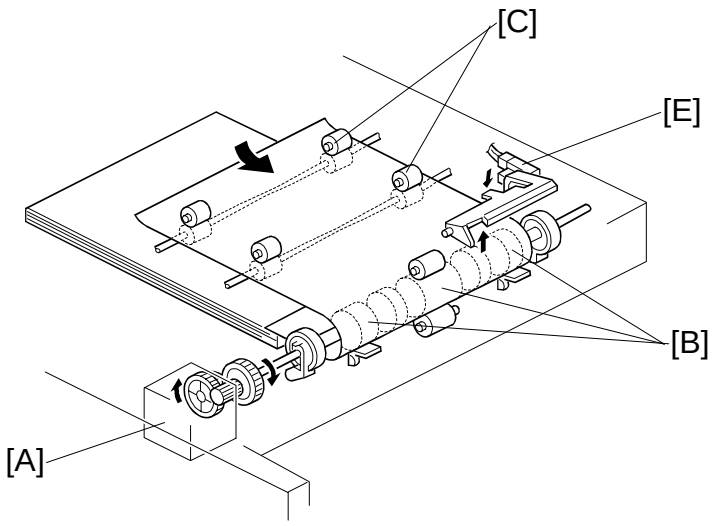
2. Paper Feed from the Duplex Tray



The paper stacked in the duplex unit is in contact with the paper feed roller [A] after the bottom plate [B] is lifted up. Then, the paper feed roller feeds the paper to the registration rollers in the copier main body via the vertical transport roller [C].

The separation roller [D] has a one-way clutch. During paper stacking, the separation roller turns with the paper feed roller. During paper feed, the separation roller does not turn, so that it can separate the sheets of paper.

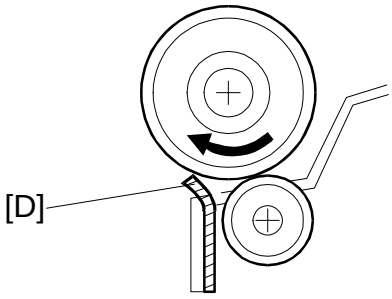
3. Duplex Entrance To Duplex Tray



A259D646.WMF

The duplex feed motor [A] starts after the leading edge of the paper activates the paper exit sensor. This motor drives the duplex feed rollers [B] and the duplex entrance rollers [C]. These rollers direct the paper from the junction gate into the duplex tray.

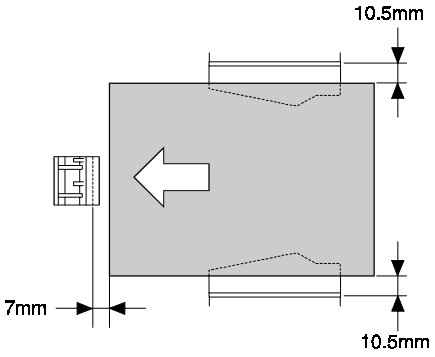
The tip of the flip mylar [D] moves to the left (front view) when the duplex feed rollers rotate to feed the copy into the duplex tray. The mylar presses the paper against the duplex feed rollers, ensuring that the trailing edge of the paper clears the guide plate.



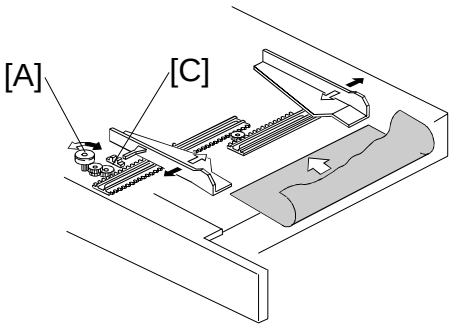
A259D654.WMF

The duplex turn sensor [E] detects the trailing edge of the paper as it enters the tray.

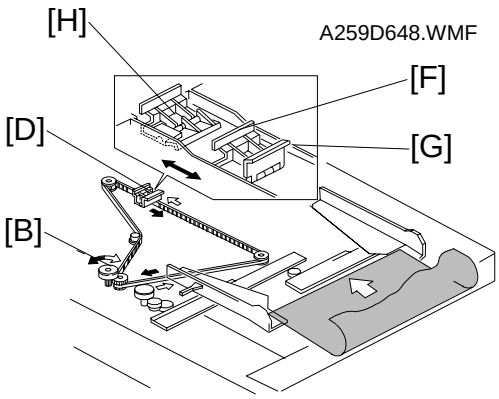
2.10.4 JOGGER MECHANISM



A259D648.WMF



A259D649.WMF



A259D650.WMF

There are two motors for driving the fences. The side fence jogger motor [A] drives the side jogger fences. The end fence jogger motor [B] drives the end jogger fence. Using two separate motors for the side and end fences allows the duplex tray to handle all paper sizes from A3/11" x 17" to A5/ 8$\frac{1}{2}$" x 5$\frac{1}{2}$" sideways.

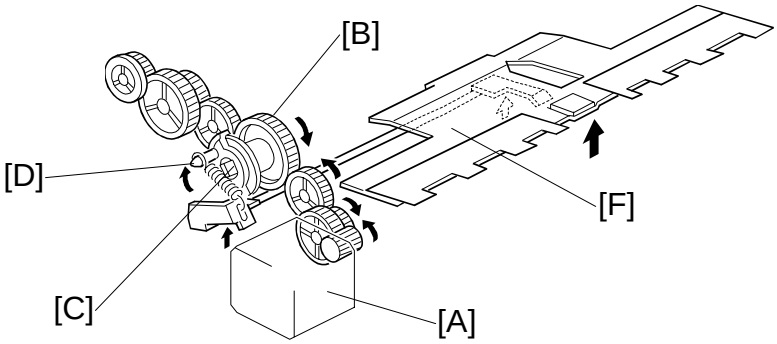
There are two home position sensors. One is for the side jogger fences [C], and the other is for the end fence [D]. When the main switch turns on, the side fence jogger motor and the end fence jogger motor move the side jogger fences and the end fence to their home positions.

When the registration clutch turns on, the side fences move 10.5 mm, and the end fence moves 7 mm away from the selected paper size. Then when the copy paper is delivered to the duplex tray, the jogger fences move inward to square the paper. (This is done 500 ms after the duplex turn sensor detects the trailing edge of the paper. The duplex turn sensor [E] is in the diagram on the previous page.) Shortly after this, the jogger fences move back to their previous positions. After the last copy of the first side copy run enters the duplex tray, the jogger fences remain against the paper stack.

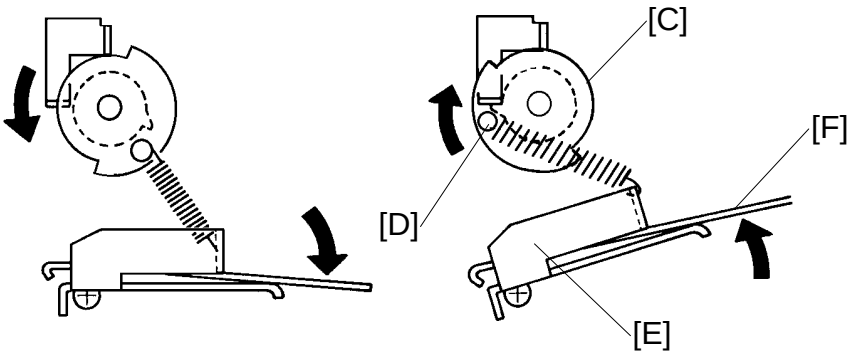
There are two end fences. One [F] is for A3/ 11 x 17" size paper. The other [G] is for sizes smaller than B4. They are included as a unit. When A3/11 x 17" size paper is in the duplex tray, the end fence unit moves to the left and the B4 end fence rotates down as it is pressed against the end fence stopper [H].

2.10.5 PAPER FEED FROM THE DUPLEX TRAY

Bottom Plate Lift Mechanism



A259D653.WMF



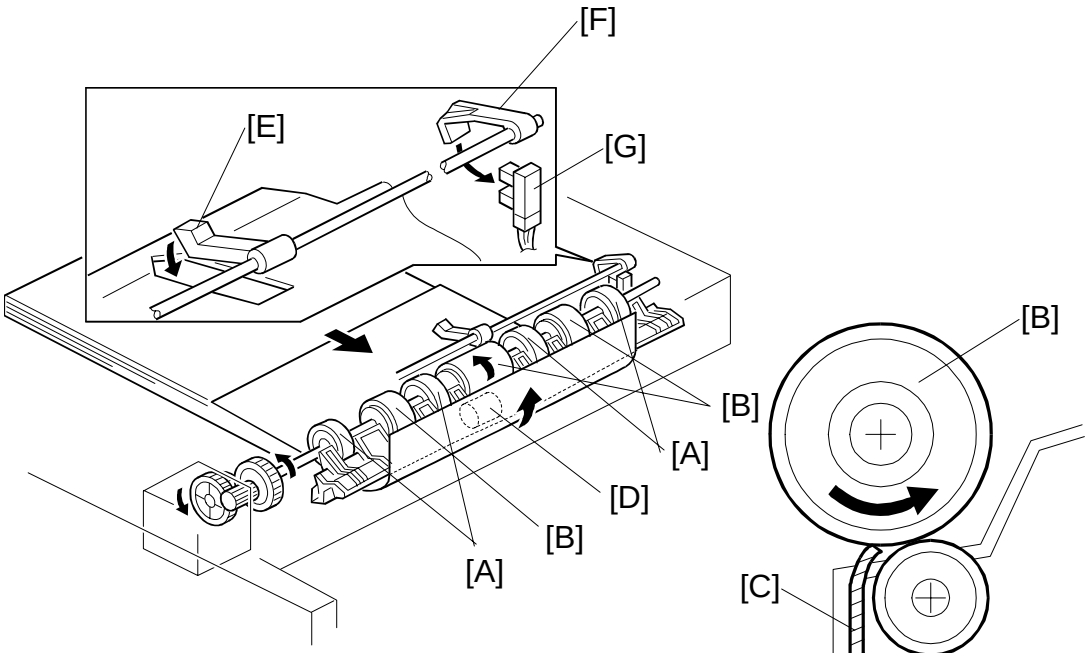
A259D655.PCX

While the first side is being copied, the duplex feed motor [A] turns clockwise and the cam clutch gear [B] turns counter-clockwise (see the above drawing). Then all copies are stacked in the duplex tray unit.

After the first side copies are done, the duplex feed motor [A] changes direction, and the cam clutch gear [B] turns clockwise. The cam clutch [C] also turns clockwise because of a spring inside the clutch. The pin [D] on the clutch lifts up the duplex lever [E] through a spring, raising the duplex bottom plate [F].

Then the duplex feed rollers feed the stacked copies to begin reverse side copying.

Paper Feed-out mechanism



A259D651.WMF

A259D647.WMF

While paper is stacking in the duplex tray, the paper flatteners [A] correct curl at the leading edge of the paper.

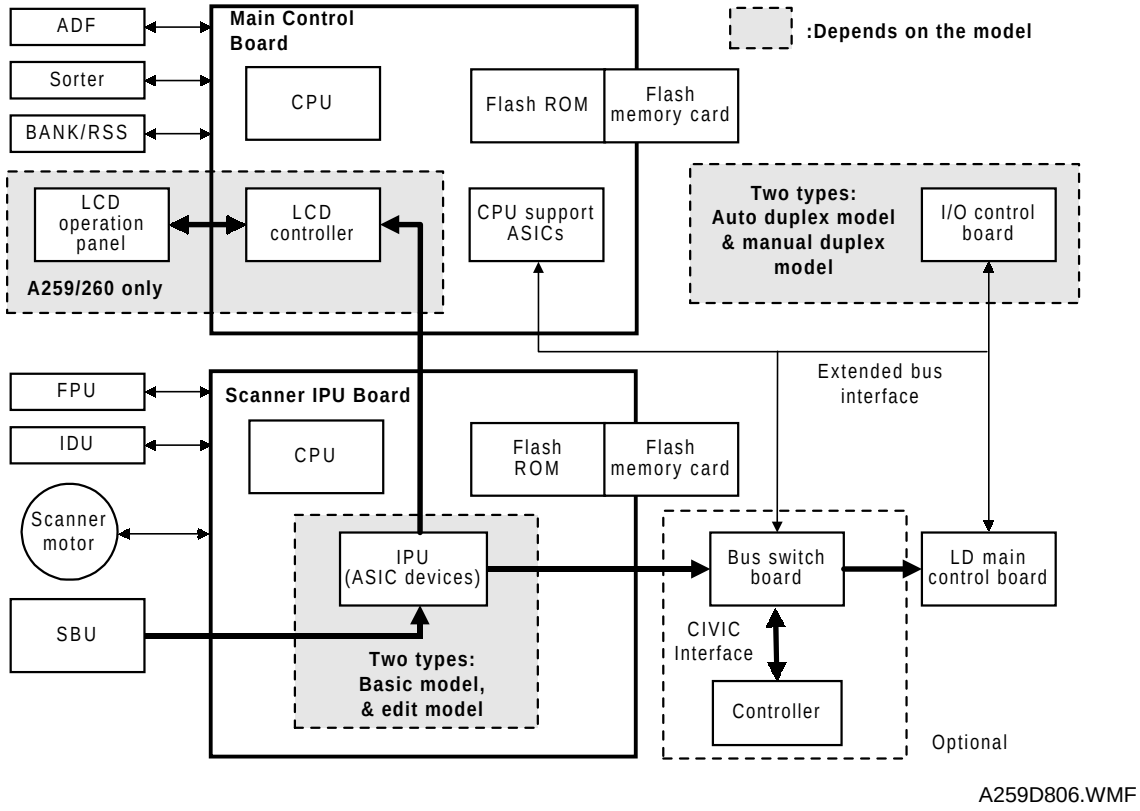
After all the paper is stacked in the duplex tray, the jogger fences square the paper and the duplex feed motor turns counter-clockwise briefly to prepare to feed the paper from the duplex tray. At this time, the bottom plate rises and the duplex feed rollers [B] move the flip mylars [C] back to the right (front view).

The duplex paper feed system consists of three sets of duplex feed rollers and a separation roller [D]. The separation roller has a one-way bearing inside, so it rotates freely during paper stacking and locks during paper feeding. The duplex feed rollers can feed only the top sheet of the stack because the separation roller functions in the same way as a friction pad does.

After the duplex tray runs out the final copy, the paper end feeler [E] drops through a slot in the duplex bottom plate. The duplex paper end actuator [F], which is on the same shaft as the duplex paper end feeler, pivots into the duplex paper end sensor [G]. Then the sensor signals the CPU to stop the next paper feed cycle.

2.11 OTHERS

2.11.1 SYSTEM CONFIGURATION



The main control board CPU manages the scanner, operation panel, and printer engine to control the entire copier system.

The scanner IPU board CPU controls the scanner motor and image data processing. Both the main control board and the scanner IPU board have flash memory so that their programs can be replaced using a flash ROM card.

The main control board controls the printer controller through the CIVIC interface (this is Ricoh's proprietary parallel colour video interface).

2.11.2 POWER STATES

Energy Saver Mode

In energy saver mode, all indicators on the operation panel except the Main Power indicator and the LED on the Energy Saver key are turned off and the fusing lamps are held in the standby state.

Power-off (Sleep) State

The power-off state of this copier conforms to the International Energy Star standard (sleep mode). Of the DC outputs (VAA, VCA, VCB, VCC1, and VCC2) from the PSU, only VCC1 is turned on; all of the other outputs are held off. In this state, power is applied only to the main control board and the operation switch, so that the machine can detect when the operation switch is pressed. In this state, the fusing lamps are off.

When the main board detects that the operation switch was pressed, the machine goes back to standby mode.

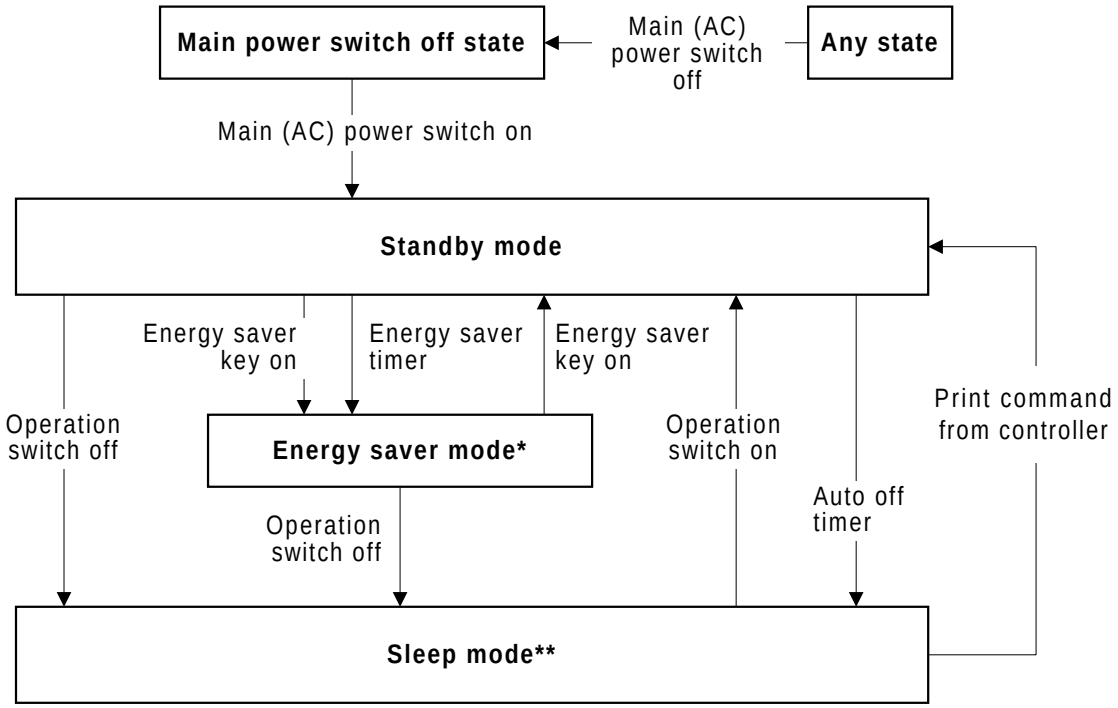
Main Power Switch Off State

When the main power switch is off, all power is shut off except the following heaters, which are always on whenever the power cord is connected to the outlet.

- Optics anti-condensation heater
- Transfer belt heater
- Paper transfer unit heater

Power State Transition Diagram

The following diagram shows the conditions in which the machine changes from one state to another.



***: LCD panel off mode**
****: Power lines are cut except for 5V line**

A259D807.WMF

The timers are all programmed by the user.

2.11.3 TOUCH PANEL (A259/A260 MACHINES ONLY)

This copier contains a large full-color LCD (640 x 480 dots) operation panel. The CPU (LCD controller) on the main control board controls this operation panel.

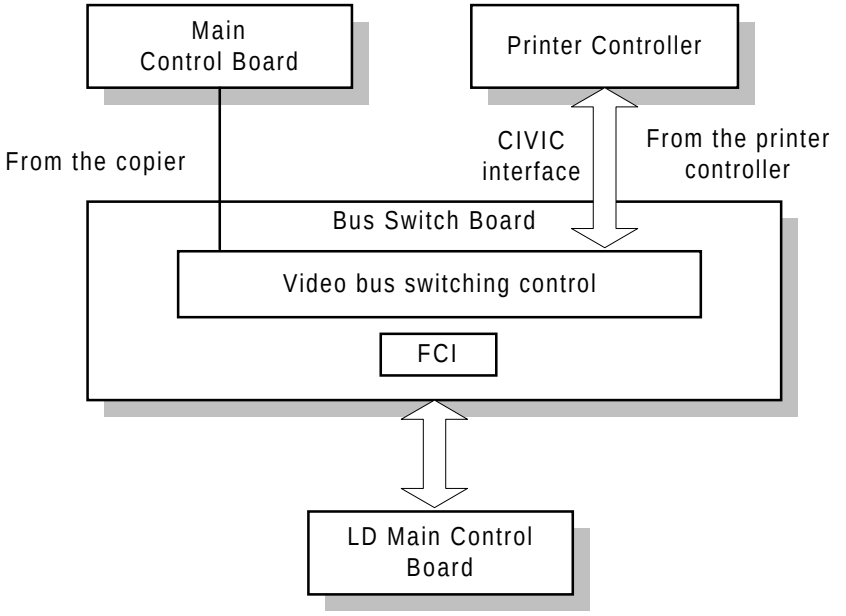
Using DMA, the scanner IPU stores the display image data generated during area manipulation in the VRAM on the main control board before it is transferred to the operation panel. Image data can be displayed in 256 colors using the 8-bit color scheme (3 bits for R, 3 bits for G, and 2 bits for B).

The area editing information that the user specifies at the operation panel is sent to the area treatment section in the scanner IPU and used for image processing in synchronization with the scanned data from the original.

The following table shows the resolution of the data. For example, if the user selects Zoom 1, the scale of the display in the editor window on the operation panel is 200%, so the machine generates 50 dpi data to display in the editor window.

	Scale
Full display	100%
Zoom 1	200%
Zoom 2	264%
Zoom 3	394%
Zoom 4	528%

2.11.4 BUS SWITCH BOARD (OPTIONAL)



A259D811.WMF

The printer controller is an option for this copier. The bus switch board interfaces the copier with the controller.

The CIVIC interface between the controller unit and the bus switch board transfers image data on an 8-bits/pixel basis for each color.

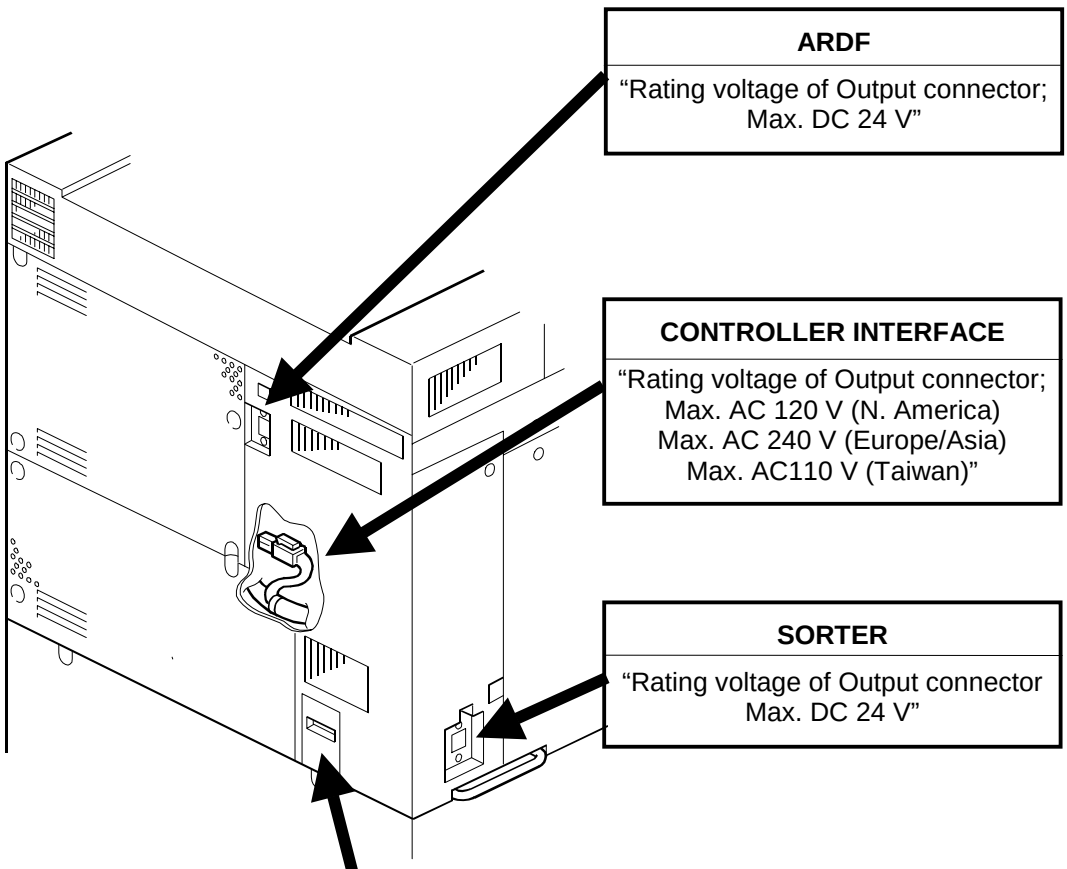
The FCI (Fine Character and Image) chip performs image smoothing and line correction. When the user selects smoothing, the FCI converts the image data (8 bits) to 7 bits of image and 1 bit of pixel positioning data, which simulates 1200 dpi resolution across the page.

3. INSTALLATION PROCEDURE

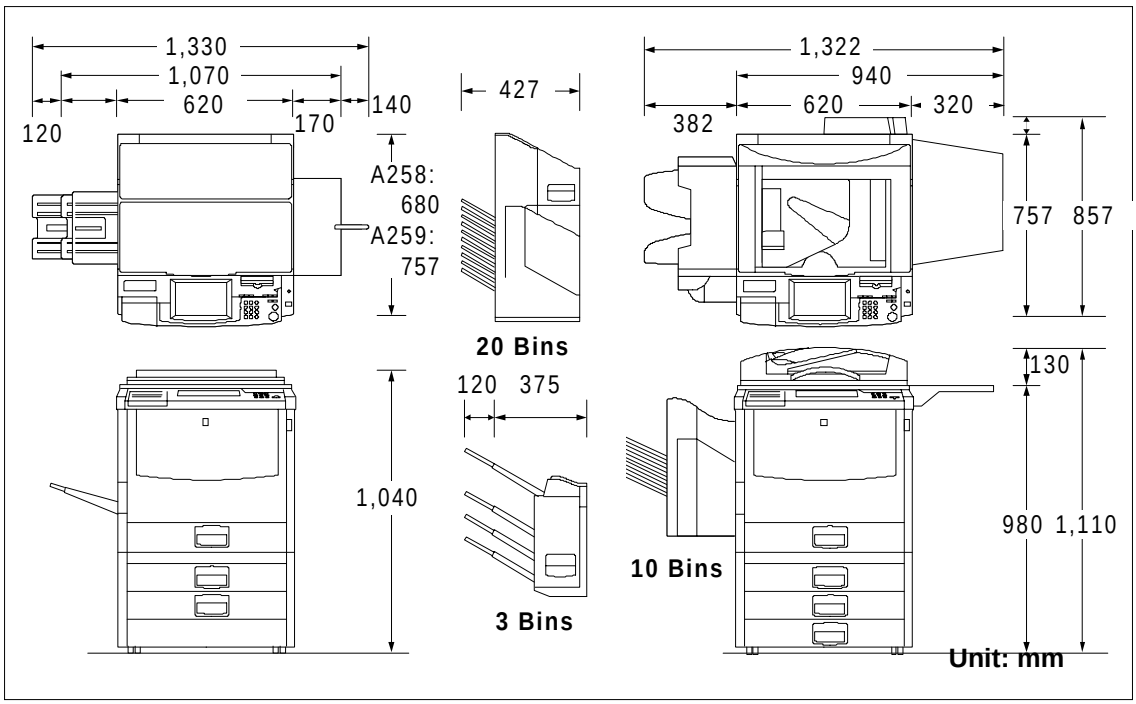
3.1 INSTALLATION REQUIREMENTS

⚠CAUTION

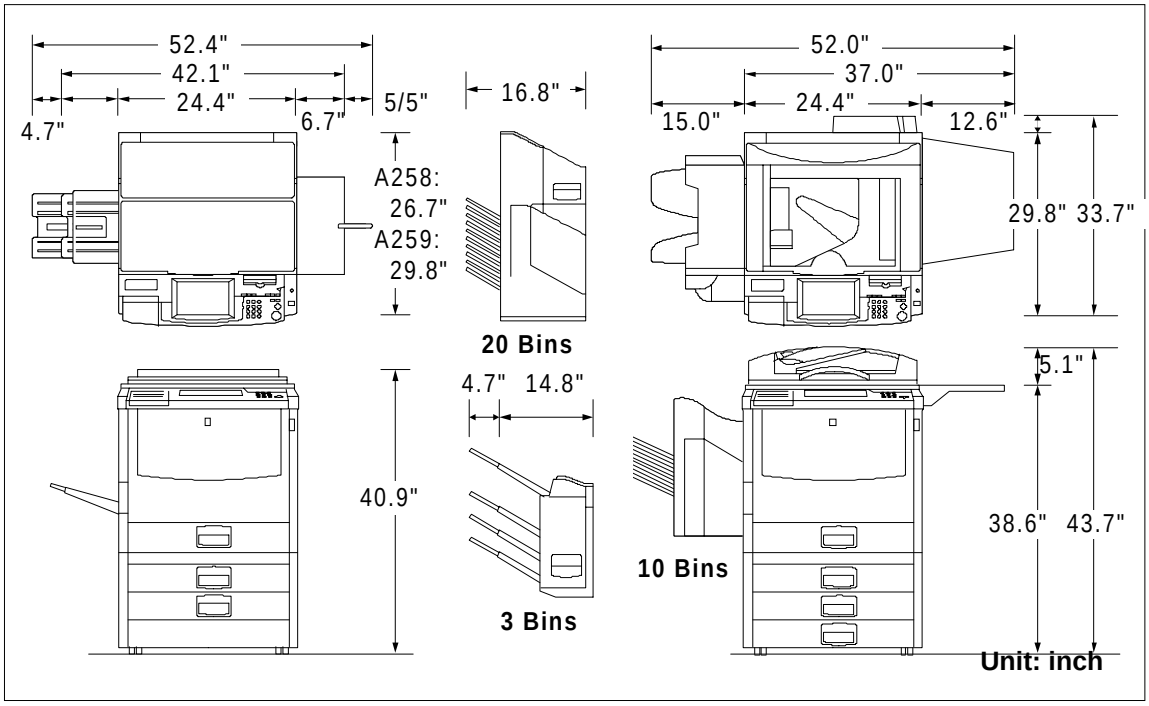
Rating Voltages for Peripherals


ARDF
“Rating voltage of Output connector; Max. DC 24 V”
CONTROLLER INTERFACE
“Rating voltage of Output connector; Max. AC 120 V (N. America) Max. AC 240 V (Europe/Asia) Max. AC110 V (Taiwan)”
SORTER
“Rating voltage of Output connector Max. DC 24 V”
A259I591.WMF
PAPER TRAY UNIT
“Rating voltage of Output connector; Max. AC 120 V (N. America) Max. AC 240 V (Europe/Asia) Max. AC 110 V (Taiwan)’

3.1.1 DIMENSIONS



A259I122.WMF



A259I121.WMF

3.1.2 ENVIRONMENTAL REQUIREMENTS

To ensure the optimum copy quality, the following environmental requirements need to be observed. When installing this copier at the customer site, make sure that the location meets the following requirements.

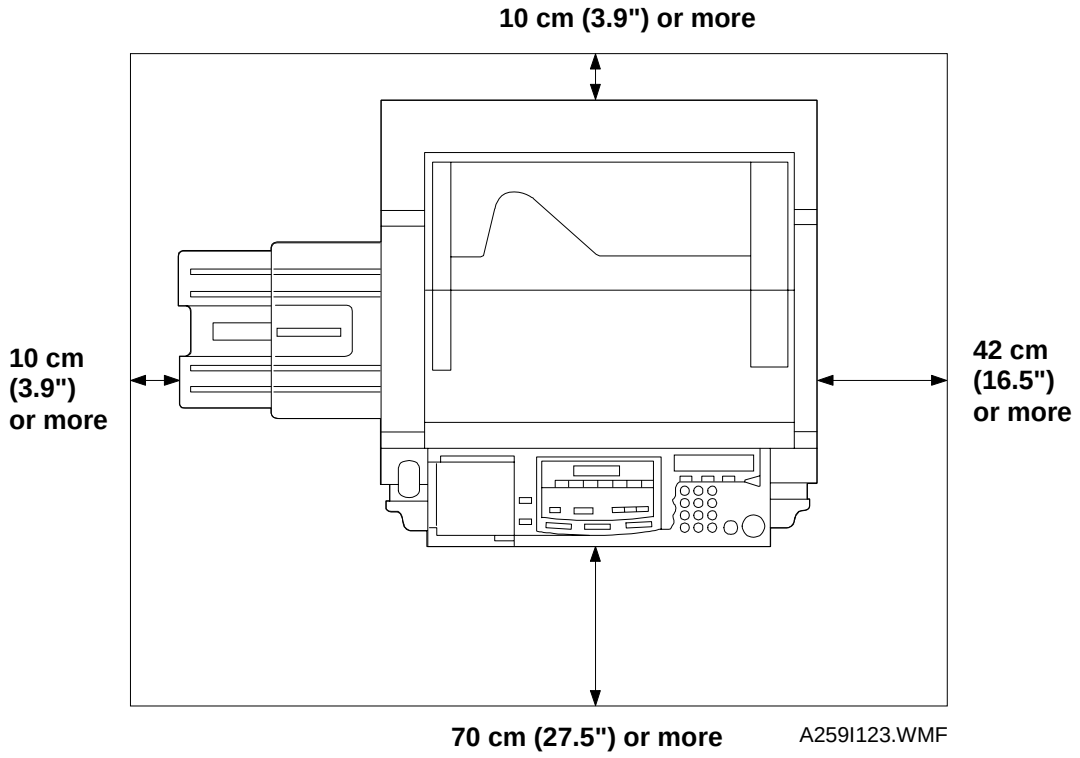
1. Avoid an area which is exposed to direct sunlight or is excessively illuminated (the illumination should not exceed 2000 lux.).
2. Avoid areas that are too hot and humid or too cold and dry.
   Standard temperature range: 10ºC to 32ºC
   Standard humidity range: 15% to 80%
3. Avoid areas near fire or heat.
4. Avoid areas that are exposed to sudden temperature changes. This includes areas where the machine will not be directly exposed to:
   1) Cool air from an air conditioner
   2) Heat from a heater.
5. Avoid a dusty area (maximum allowable amount of dust: 0.10 mg/m^3).
6. Avoid a poorly-ventilated area (required minimum ventilation: 30 m^3/hr/man
7. Do not place the machine where it will be exposed to corrosive gases.
8. Place the machine on a level floor (the inclination on any side should be no more than 5 mm).
9. Do not place the machine where it may be subjected to strong vibrations.
10. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.
11. If the machine is installed close to other electronic equipment, they may interfere with each other. To avoid this problem:
    1) Keep the machine as far away as possible from television sets or radios.
    2) Reorient the receiving antenna of television sets and radios as needed.
    3) Use a separate outlet for the machine.

⚠CAUTION

1. **Do not install the machine in a very humid or dusty area.**
2. **Do not install the machine on a shaky or inclined floor.**
3. **Completely pull out and hold all four handles when moving the machine. If the handles are not fully pulled out, or if you hold other parts of the machine, your fingers may be caught in the machine and get seriously hurt.**
4. **Do not lift the A259/260 copier by grasping the operation panel; it may be damaged.**
5. **When installing the optional paper tray unit, lock the caster wheels. If this is not done, the paper tray unit may fall and hurt someone.**
6. **When moving the machine after installing the paper tray unit, do not apply force to the upper part of the machine. The copier may fall off the paper tray unit.**

3.1.3 MINIMUM SPACE REQUIREMENTS

Provide clearance for the copier, as shown below. If one or more options (such as the ADF or sorter stapler) are added to the copier, this clearance should be provided around the entire system.



NOTE: A space of at least 10 cm (3.9") at the rear of the machine is important for machine ventilation.

3.1.4 POWER REQUIREMENTS

⚠WARNING

1. **Install the machine as close to the outlet as possible. Firmly plug in the machine after installation.**
2. **Avoid multi-wiring.**
3. **The power cord should be placed where it cannot be stepped on or flattened by the machine. When installing the machine, route the power cord out of the way of general traffic.**
4. **Be sure to connect the power cord's grounding wire.**

1. Input voltage level:
   US Model: 120 V, 60 Hz: More than 12 A
   Europe/Asia Model: 220 V to 240 V, 50/60 Hz: More than 8 A
   Taiwan Model: 110 V, 60 Hz: More than 12 A
2. Permissible voltage fluctuation: ±10%
3. Do not set anything on the power cord.

3.2 COPIER INSTALLATION

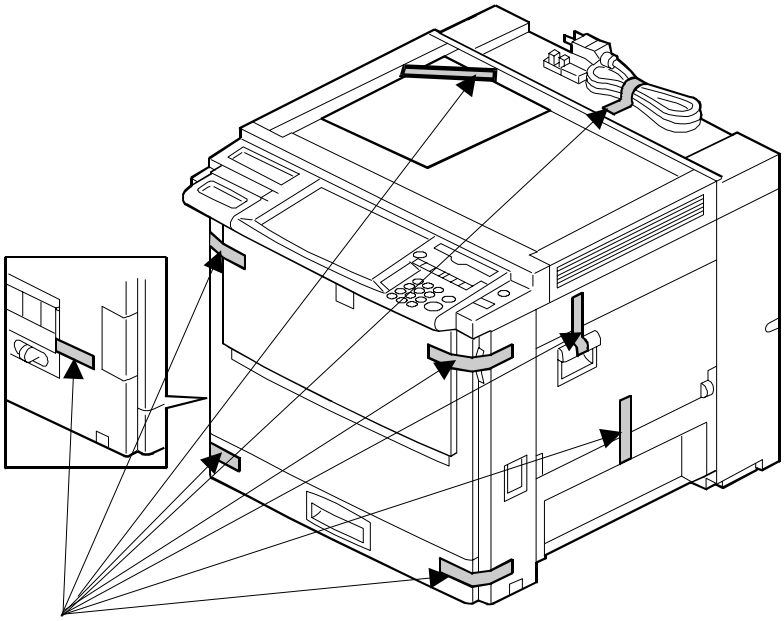
3.2.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. Paper Size Decal	1
2. Operating Instructions (not -26/-27 machines)	1
3. Quick Guide (not -26/-27 machines)	1
4. New Equipment Condition Report (-17, -19, -27, -29 machines only)	1
5. User Survey Card (-17 machines only)	1
6. Exit Tray	1
7. Holder for Operating Instructions	1
8. Logging Data Sheet	1
9. Instruction Procedure Sheet (Prevention against counterfeiting)	1
10. Favorite Key Decal (A258 only)	1
11. Precaution Decal (not -26/-27 machines)	1
12. Screw Driver (A258 only) (Keep in the paper tray)	1
13. Editor Pen (A259/A260 only)	1

3.2.2 COPIER INSTALLATION PROCEDURE

Tape Removal

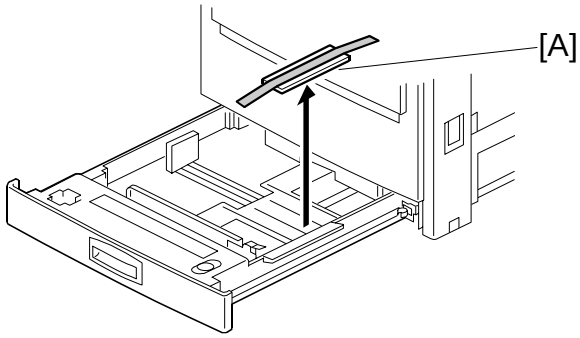


Filament Tape

A259I101.WMF

1. Remove the strips of filament tape indicated in the above diagram.

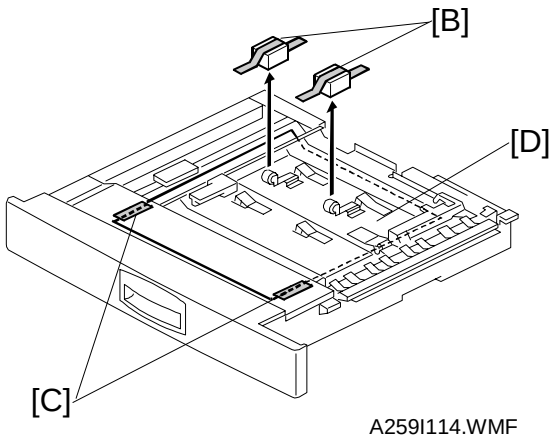
– A258 only –



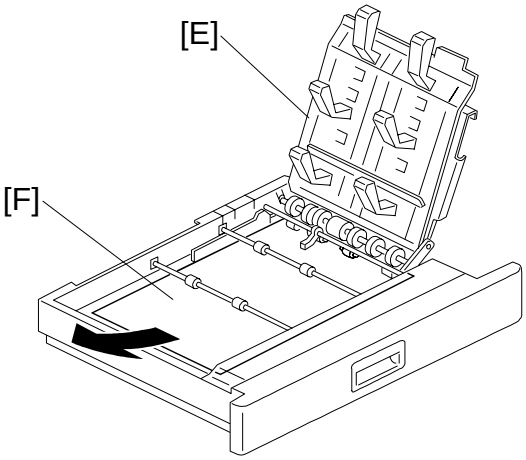
A259I115.WMF

1. Remove the clamping materials [A] from the paper tray.

– A259/A260 only –



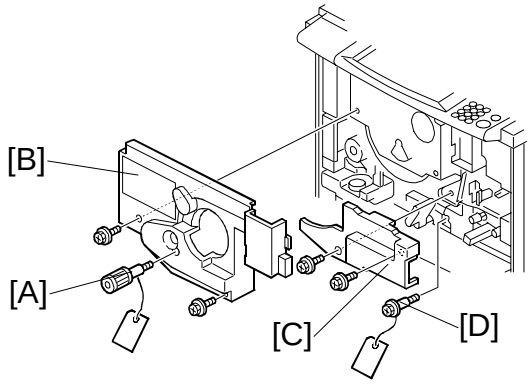
A259I114.WMF



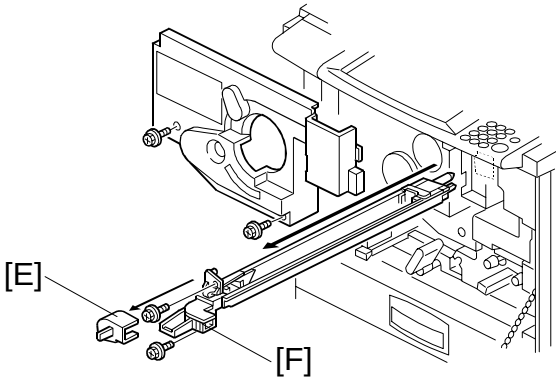
A259I502.WMF

1. Remove the protectors [B] from the metal rollers.
2. Peel off the two pieces of filament tape [C] from the duplex unit and remove the protective sheet [D].
3. While lifting the lower guide plate [E] on the duplex unit, take out the protective sheet [F].

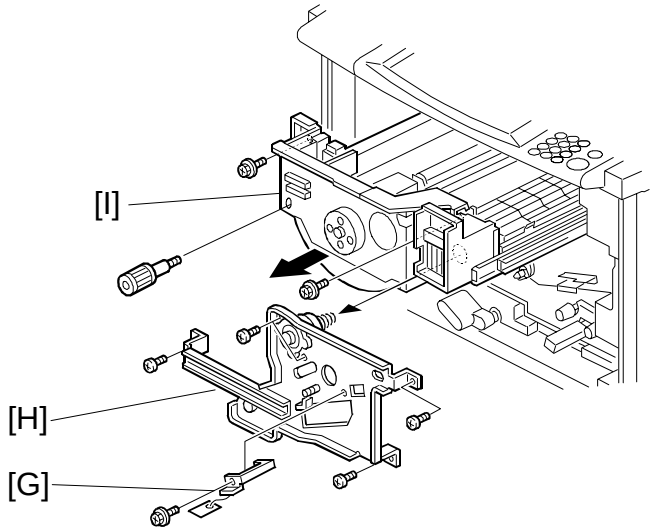
Removing the Inner Transfer Cover and Paper Transfer Locking Screw



A259I506.WMF



A259R201.WMF



A259I507.WMF

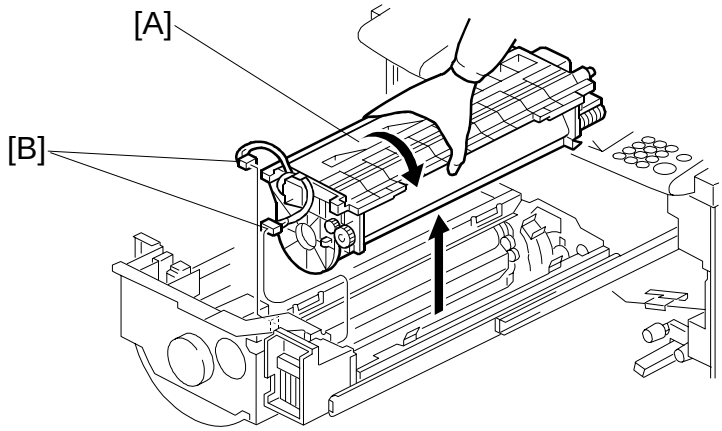
NOTE: Place a mat on the floor to keep the floor clean before doing this procedure.

1. Open the front cover and remove the revolver locking screw [A] and the inner cover [B] (2 screws). Keep revolver locking screw [A] on the drawer unit front panel, for future use.
2. Remove the inner transfer cover [C] (2 screws).
3. Remove the paper transfer locking screw [D].
   NOTE: Keep screw [D] for transportation.
4. Remove the charge coronal unit duct cover [E].
5. Remove the charge corona unit with corona cleaner [F] (2 screws).
6. Remove the transfer belt lock stay [G] (1 screw).
7. Remove the transfer belt stay [H] (5 screws).
8. Pull out the drawer unit [I] (2 screws).

NOTE: After pulling out the drawer unit, take one of the following actions to prevent the drum unit from being exposed to external light:

- Complete the procedure promptly and replace the drawer unit as soon as possible.
- Pull out the drum unit and shield it with a black sheet or 5 (or more) white sheets of paper (see the next page for a diagram).

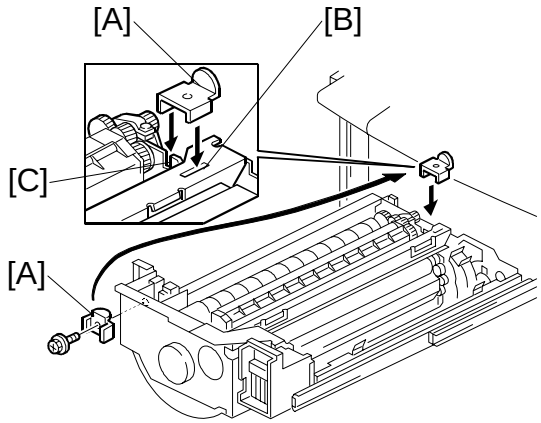
Developer Installation



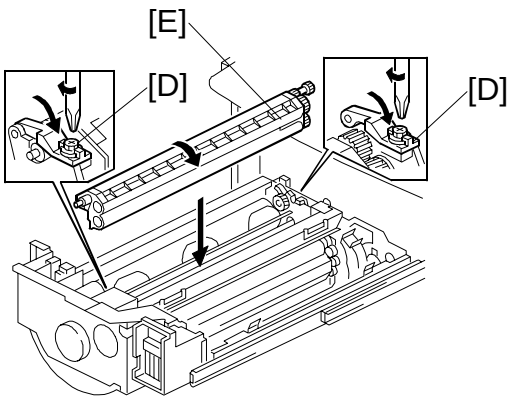
A259R204.WMF

NOTE: 1) If the drawer unit [A] is left out, the drum is exposed to light. This may cause optical fatigue, resulting in image anomalies (see the Troubleshooting section 7.4). Therefore, after pulling out the drawer unit, remove the drum unit (2 connectors [B]) and cover it with a black sheet or 5 (or more) white sheets of paper.

2) The revolver unit rotates counterclockwise. Do NOT try to turn it in the other direction.



A259R301.WMF



A259R302.WMF

1. Remove the left revolver stopper [A] from its storage place in the drawer unit (1 screw) and put it in the rear hole [B] in the revolver side panel and in the notch [C] on the drawer unit stay.

⚠CAUTION

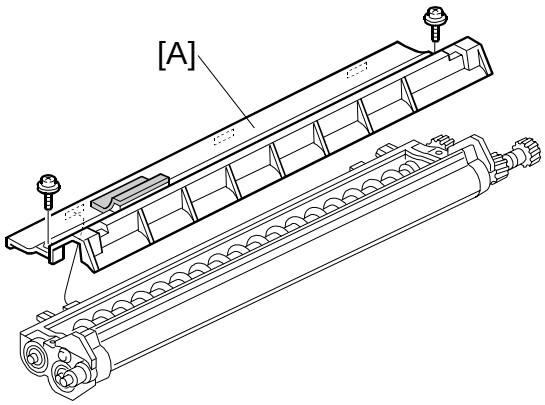
If you do not install the revolver stopper before removing the development unit, the revolver may rotate, causing permanent damage to the development unit or its holder.

2. Open the locks [D] at both ends of the development unit [E] (1 screw each) and remove the development unit [E].

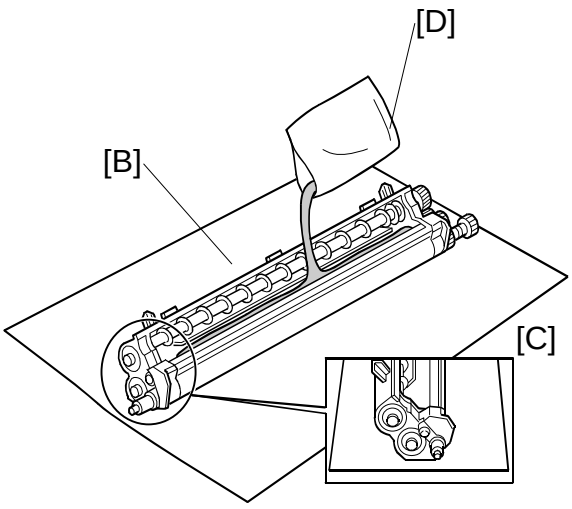
NOTE: When attaching and detaching the development unit, be sure to turn it in the direction shown in the diagram. Turning the development unit in the wrong direction may cause developer to spill from the toner hopper.

⚠CAUTION

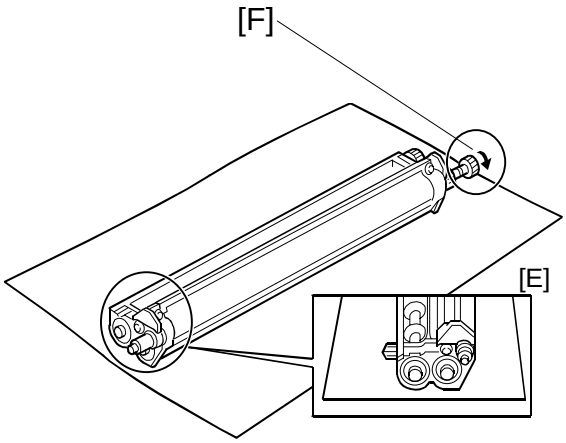
Remove the development units one color at a time (never remove two or more development units from the revolver at the same time). Removing two or more development units at the same time may upset the balance of the revolver. This will cause the revolver to revolve by itself and personal injury may occur.



A259R303.WMF



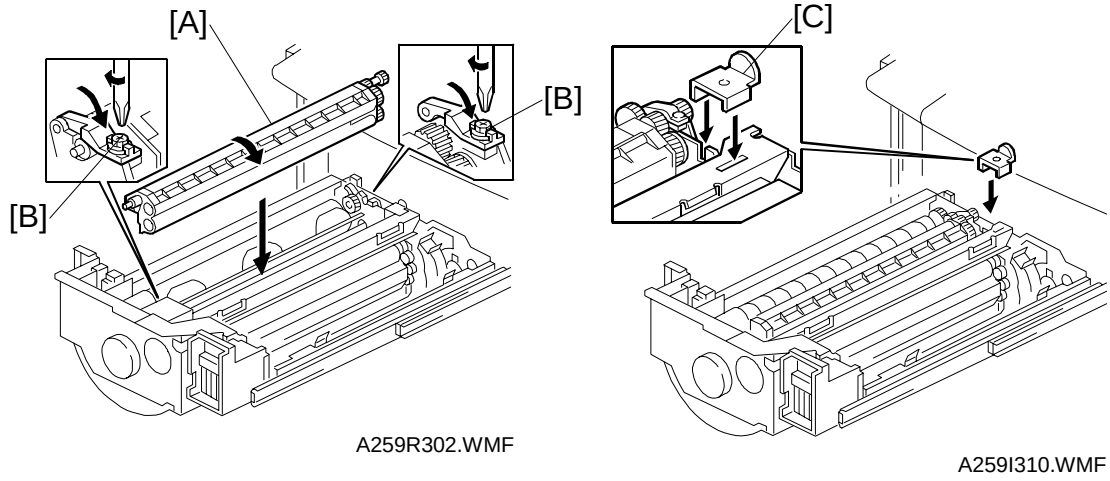
A259R306.WMF



A259R309.WMF

3. Remove the developer cover [A] (2 screws).
4. Place the development unit [B] in the developer installation position [C] and pour in 1 bag (380 g) of developer [D].

   NOTE: Pour developer into the auger from the development roller side. This speeds the agitation of the developer and prepares it for use more quickly.
5. Place the development unit in the developer scoop-up position [E], rotate the sleeve in the forward direction [F] to scoop up developer, then check that the roller is evenly coated with developer from front to rear.



A259R302.WMF

A259I310.WMF

6. Replace the developer cover (2 screws) and put the development unit [A] in the drawer unit (2 lock screws [B]).

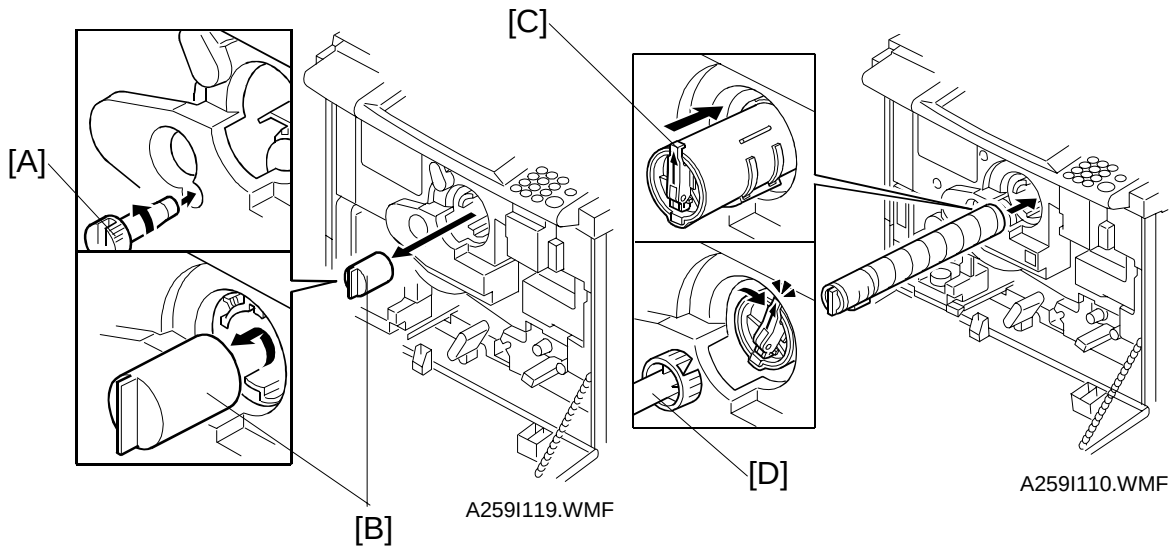
⚠CAUTION

1. **When replacing the developer cover, do not apply excessive force to the center of the development unit. The doctor gap will bend, altering the developer scooping efficiency.**
2. **Make sure that the developer locks (front and rear) are secured with screws before rotating the revolver. This protects the developer assembly and locks from damage.**
3. **Tighten the developer lock screws firmly. Loose lock screws will cause the PG (Photoconductor Gap) to fluctuate.**

7. Remove the revolver stopper [C], rotate the revolver to the next color, then follow the developer installation procedure from step 1.
   NOTE: The revolver unit rotates counterclockwise. Do NOT try to turn it in the other direction.

⚠CAUTION

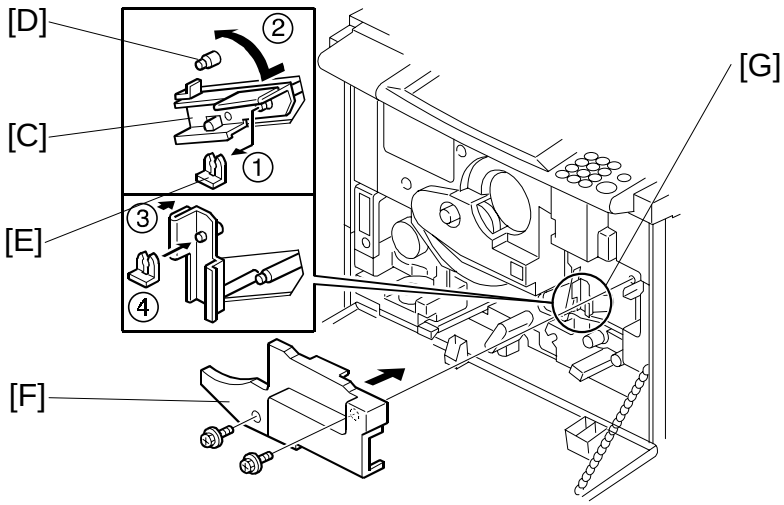
If you do not install the revolver stopper before removing the development unit, the revolver may rotate, causing permanent damage to the development unit or its holder.



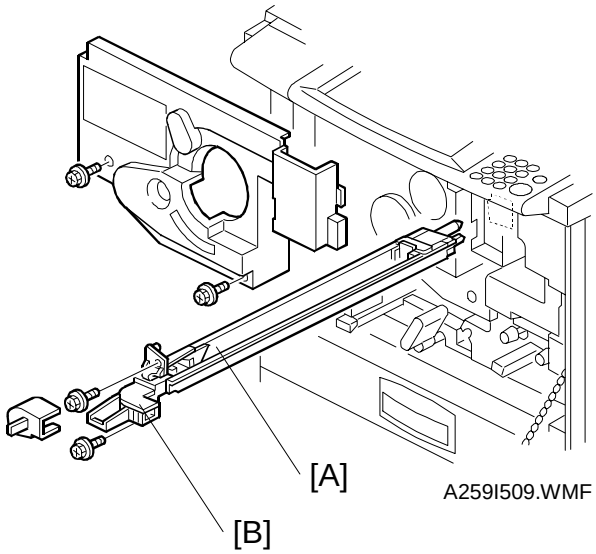
8. After all the color developers have been installed, return the revolver stopper to the front stay of the drawer unit.
9. Reinstall the drum unit (2 connectors).
10. Close the drawer unit (2 screws).
11. Rotate the revolver unit until the cartridge replacement position with the provided screwdriver tool [A]. This tool is at the front of the paper tray (A258) or in the carton (A259/A260).
12. Remove the dummy toner cap [B].
13. Hold the new toner cartridge horizontally and shake it 5 or 6 times.
14. Remove the seal on the toner cartridge.
15. Insert the toner cartridge with the "↑" mark pointing up [C].
16. Turn the knob clockwise to the "▲" mark until it clicks [D]. (Use the other end of the provided screwdriver tool, as shown in the diagram.)
17. Repeat steps 11 to 16 for all colors.

NOTE: 1) Do NOT rotate the revolver unit between removing the dummy toner cap and installing the toner cartridge. Otherwise, toner and developer will spill out from the development unit.
2) The revolver unit rotates counterclockwise. Do NOT try to turn it in the other direction.

Pressure Release Lever Set-up



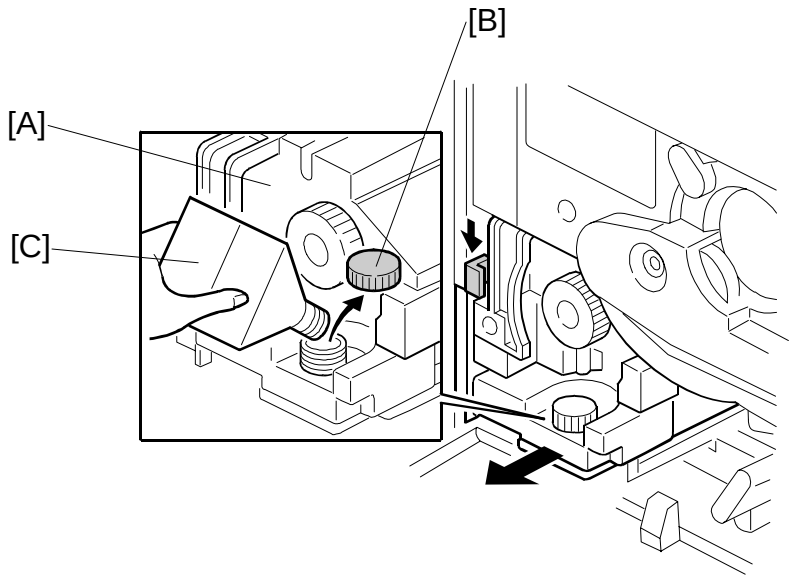
A259I104.WMF



A259I509.WMF

1. Install the charge corona unit [A] with the corona cleaner [B] (2 screws).
2. Reinstall the transfer belt stay (5 screws).
3. Set up the pressure release lever [C] as follows:
   1) Remove the snap ring [E] from the transfer unit.
   2) Turn the pressure release lever counterclockwise.
   3) Fit the pressure release lever on the pin [D].
   4) Secure the pressure release lever with the snap ring [E].
4. Install the inner transfer cover [F] (2 screws).
5. Install the inner cover (see Removing the Inner Transfer Cover and Paper Transfer Locking Screw).

Installing Fusing Silicone Oil



A259I106.WMF

1. Draw the fusing unit [A] half-way out of the main unit and remove the oil cap [B].
2. Pour in silicone oil [C].
3. Close the oil cap and push the fusing unit back in.
4. Close the front cover.

⚠CAUTION

Take care not to spill silicone oil on the floor. If silicone oil spills on the floor, wipe it up completely; otherwise, the floor will become slippery and someone could slip and fall.

Initialization and Function Checks

1. Open the front cover and turn on the main switch.
2. When “Close the Front Cover” is displayed, close the front cover, then enter SP mode. [→ 1 → 0 → 7 → C/⊘]
3. Perform the developer setup procedure for all colors using SP2-225-005, "All Colors." Press 1 and Enter to start this process.
4. When the end-of-setup message appears, look at the code displayed on the operation panel or enter SP mode 3-964 (A258 only) to check that the result is "1" (successful).
   NOTE: If the result code is a number other than 1, consult the error code chart (see the Troubleshooting section).
5. Select the tray paper size (see “Setting the Tray Paper Size” on the next page).
6. After the warm-up procedure ends, check the copy quality in each of the following modes: Text, Photo and Text/Photo.
7. If necessary, do the ACC (Auto Color Calibration) in the User Tools (“Copy Features” → “Image Adjustment”) to make sure that the chart is printed normally.

⚠CAUTION

It is not necessary to adjust the Auto Color Calibration (ACC) unless the customer is unsatisfied with the copy samples. The ACC was factory adjusted. For the detailed auto color calibration procedure, refer to the User Tools section of the Operating Instructions manual for the customer.

8. When using the optional paper tray unit, adjust the registration for each tray if required (see “Replacement and Adjustment – Paper Feed and Registration - Copy Image Area Adjustment”).

Setting the Tray Paper Size

First, change the position of the side fences and the end fence in each tray to match the paper size you will be using. Then set the paper size for each tray at the operation panel using the following procedure.

1. Press the “User Tools” key.
2. Make sure that the ‘System Settings’ menu is selected, then press the “OK” key.
3. Press the “NEXT” key until “Tray Paper Size” is displayed.
4. Press the “OK” key.
5. Select the tray with the ◀ ▶ keys, then press the “OK” key.
6. Select the required size with the ◀ ▶keys, then press the “OK” key.
7. Repeat steps 5 and 6 for each paper feed tray.
8. Press the “User Tools” key to exit the User Tools.
9. Make sure that the paper size in the trays matches the size that you just set up with the user tools.

Setting the Language and Unit of Measurement

When the required language is other than English, French, German, Italian and Spanish, the main program for that language must be downloaded to the main control board. Then, the desired language can be selected. (Replacement and Adjustment – System and Electronics - Main Program Downloading)

– SP5-009-001 –

Setting Value	Language	Setting Value	Language
0	Japanese (not available)	8	Danish
1	English	9	Swedish
2	French	10	Norwegian
3	German	11	Czech
4	Spanish	12	Polish
5	Italian	13	Russian
6	Portuguese	14	Brazilian Portuguese
7	Dutch	15	Taiwan Chinese

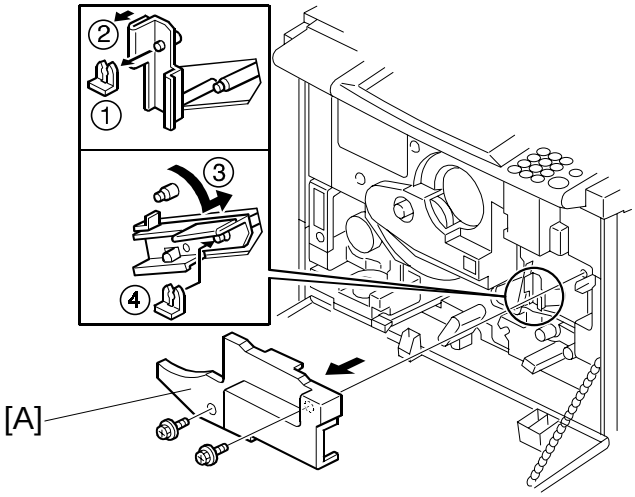
The following procedure outlines how to change the machine language.

1. Enter SP mode.
2. Enter SP5-009-001 “Display Language”.
3. Enter the appropriate value from the above table.
4. If necessary, change the measurement to either Standard (inches) or Metric (millimeters) with SP5-009-002.
   0: Metric (mm) 1: Standard (inches)
   NOTE: By using SP5-009-002, the display for the unit measurement and the Enlargement/Reduction ratio shifts.
5. Turn the machine off/on and check the language and unit measurement on the LCD.

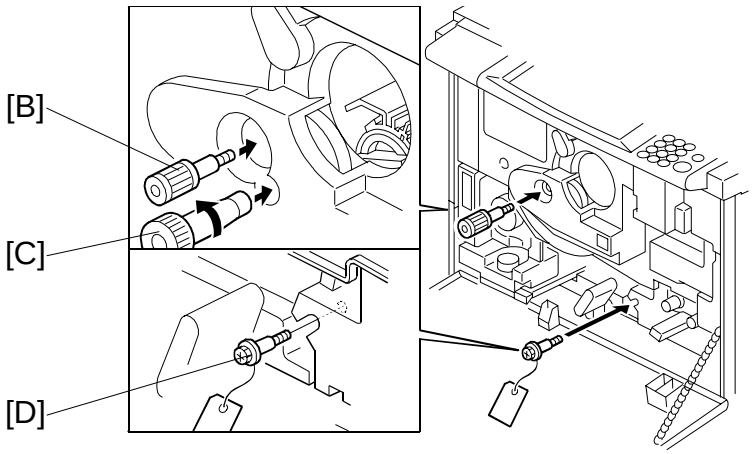
Resetting the Counter

1. Enter the SP mode.
2. Enter SP7-825, "Total Counter 0 Reset."
3. Quit SP mode and make sure that the counter shows zero using the [Counter] key on the operation panel.

3.2.3 RELOCATION PROCEDURE



A259I117.WMF



A259I116.WMF

1. Remove the inner transfer cover [A] and release the belt pressure as shown:
   1) Take off the snap ring ① and pull the lever off the pin ②.
   2) Move the lever down ③ and put the snap ring back on ④.
2. Reinstall the transfer unit bracket and the inner transfer cover.
3. Install the revolver locking screw [B] into the development unit through the H.P detector board using the special screwdriver tool [C] stored in the paper tray.
4. Install the paper transfer locking screw [D].
5. Reinstall the transfer unit bracket.

⚠CAUTION

After removing the lock screws after reinstallation, keep them in a safe location, because you will need them later.

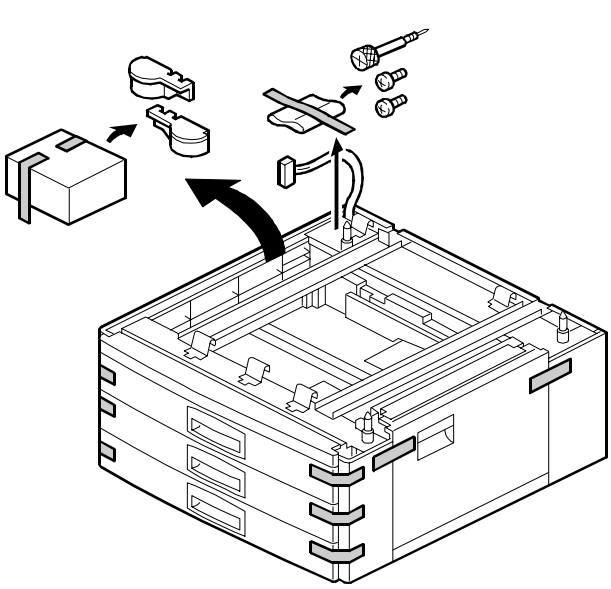
3.3 PAPER TRAY UNIT (A832/A833)

3.3.1 ACCESORY CHECK

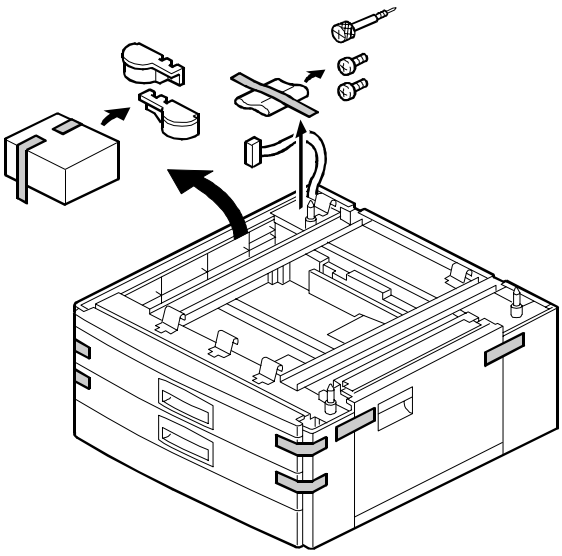
Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. Right Support Bracket	1
2. Left Support Bracket	1
3. Screw Driver (in the first tray)	A832: 1 A833: 1
4. Joint Screw	2
5. Screw – M4 x 8	4
6. Installation Procedure	1

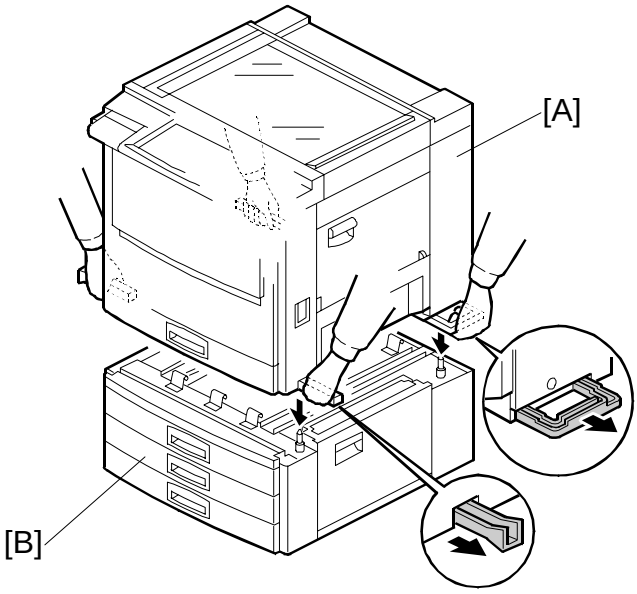
3.3.2 INSTALLATION



A832I501.WMF



A832I505.WMF

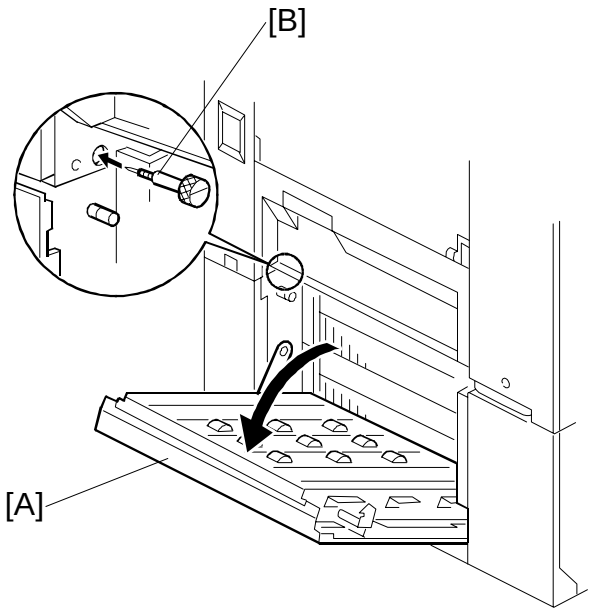


A832I503.WMF

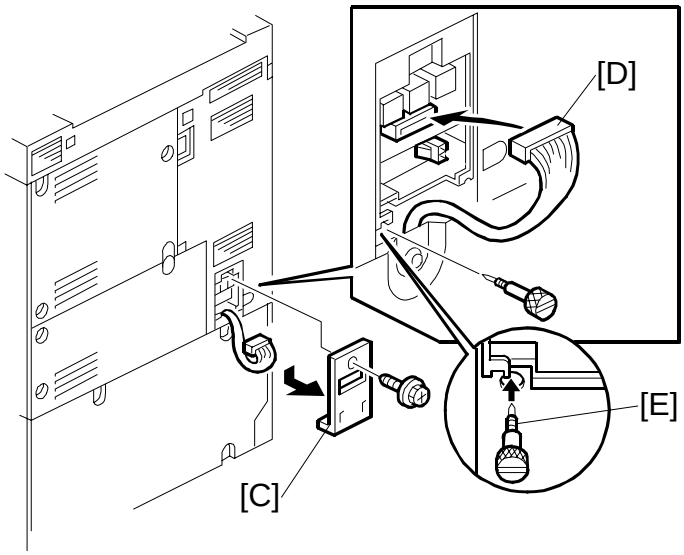
⚠CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the strips of tape as shown.
2. Set the copier [A] on the paper tray unit [B].

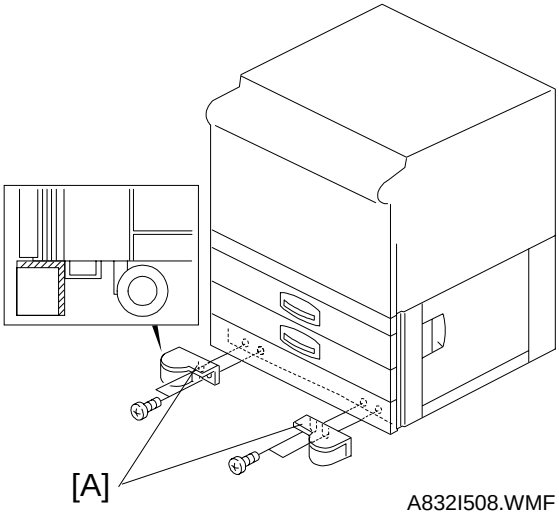


A832I507.WMF

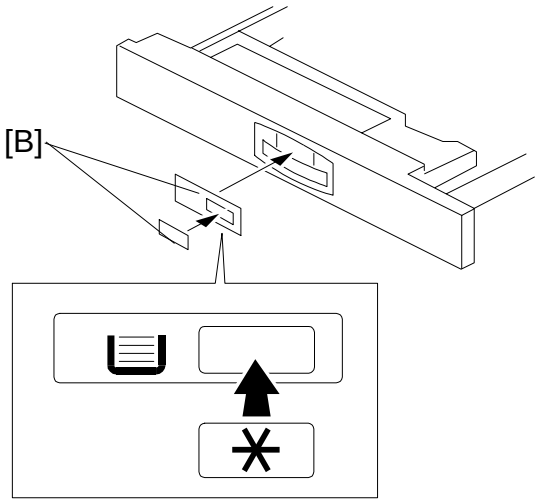


A832I504.WMF

3. Open the right door [A] of the paper tray unit.
4. Secure the copier to the paper tray unit with the joint screw [B].
5. Remove the connector cover [C] from the rear cover of the copier (1 screw).
6. Connect the cable [D].
7. Secure the copier to the paper tray unit with the joint screw [E].
8. Attach the connector cover [C] to the rear cover of the copier (1 screw).



A832I508.WMF



A832I509.WMF

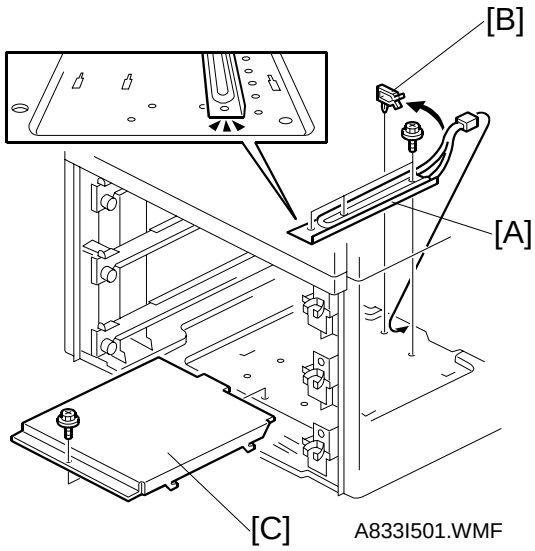
9. Attach the support brackets [A] to the bottom of the paper tray unit as shown (4 screws).

⚠CAUTION

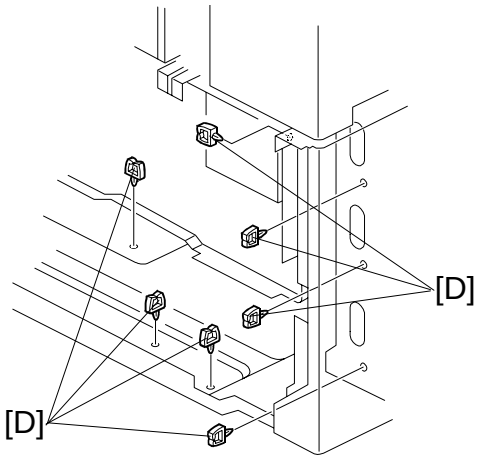
If you do not attach the support brackets, the machine may fall forwards when the paper trays are pulled open.

10. Pull out the paper tray and load paper into it. (The paper size and direction for each tray should be designated by the customer.) Position the side and rear fences properly.
11. Turn on the main switch.
12. Enter the proper paper size for each tray by following the procedure in the copier's manual.
13. Attach the appropriate tray decals [B] which are included in the accessory box with the main copier.

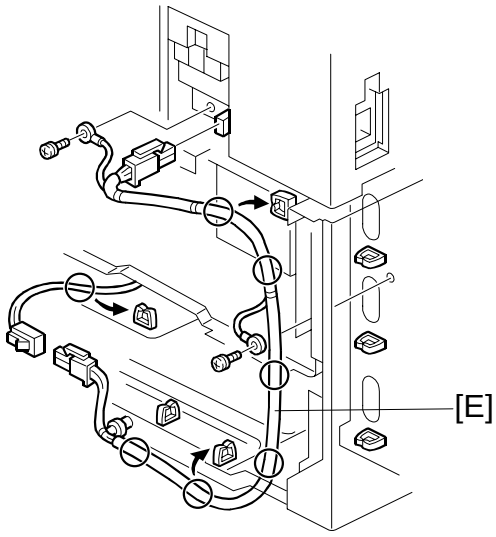
TRAY HEATER (OPTION)



A833I501.WMF



A833I502.WMF

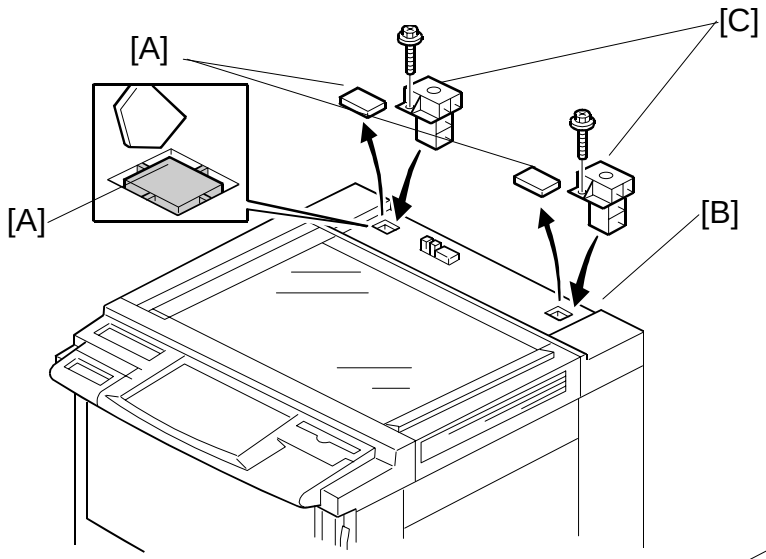


A833I503.WMF

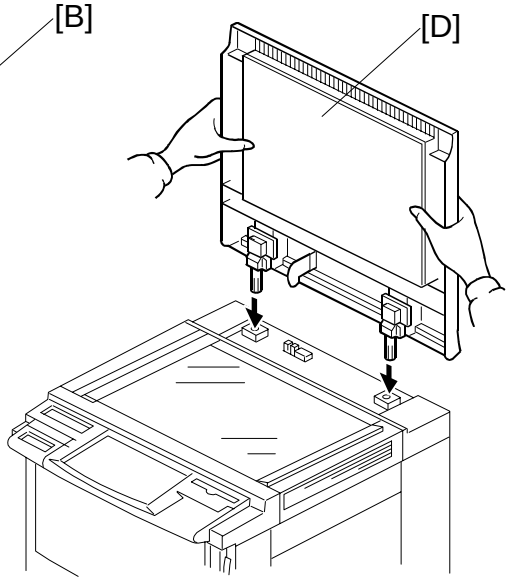
1. Remove all the trays (A832: 2 trays, A833: 3 trays).
2. **A832 only:** Remove the lower front cover (2 screws).
3. Remove the rear cover (4 screws).
4. Install the heater [A] (3 screws and 1 clamp [B]).
   NOTE: The heater should be installed at the right side on the frame.
5. Install the radiator plate [C] (1 screw).
6. Install the 9 clamps [D] as shown.
7. Connect the cable [E] to the heater and the copier (9 clamps and 2 screws).

NOTE: After replacing the paper tray, adjust the side-to-side registration (see Replacement and Adjustment – Paper Feed and Registration).

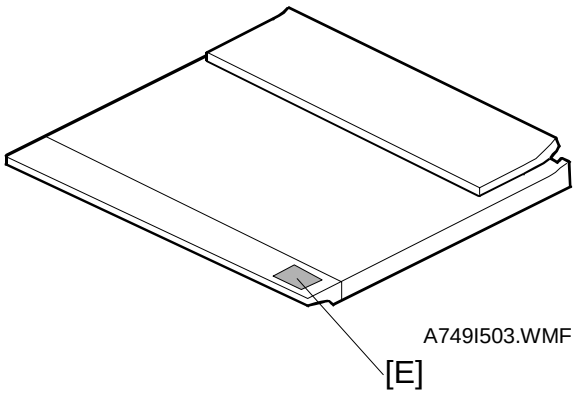
3.4 PLATEN COVER (A749-01)



A749I501.WMF



A749I500.WMF



A749I503.WMF

1. Cut the platen holder cover [A] out of the upper rear cover [B] with wire cutters.
2. Insert the platen holders [C] as shown (1 screw for each).
3. Install the platen cover [D] as shown.
4. Attach the caution decal [E] which comes with the copier as shown.

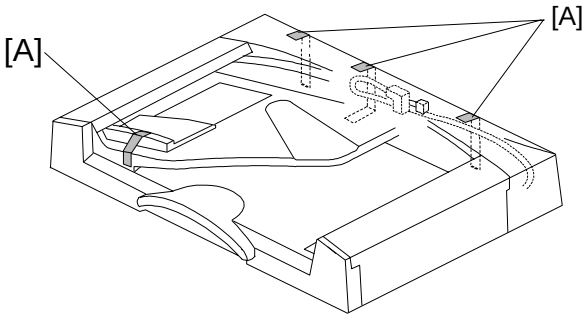
3.5 ARDF (A663)

3.5.1 ACCESSORY CHECK

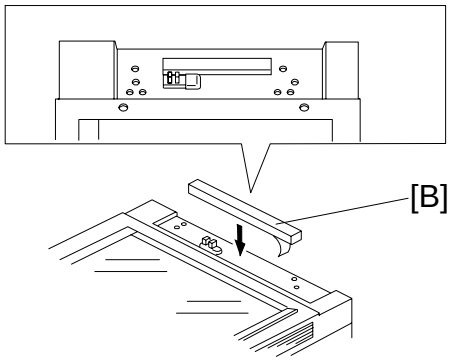
Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. New Equipment Condition Report	1
2. Installation Procedure	1
3. Stud Screw	1
4. Philips Screw with Flat Washer – M4 x 10	2
5. Sponge Retainer	1

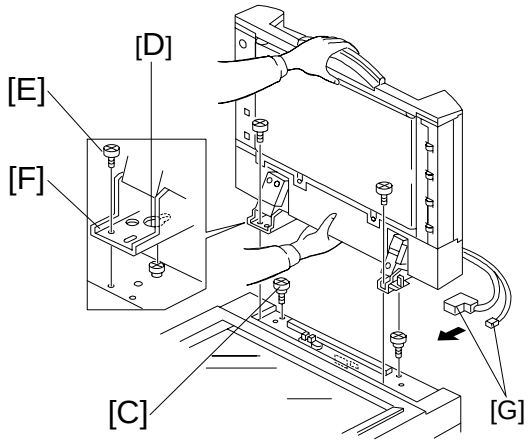
3.5.2 INSTALLATION



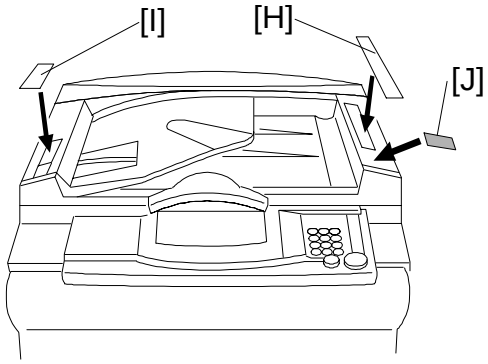
A663I500.WMF



A663I501.WMF



A663I502.WMF



A663I503.WMF

⚠CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the strips of tape [A].
2. Stick the sponge retainer [B] on the top cover of the copier as shown.
3. Tighten the two stud screws [C].
4. Mount the ARDF by aligning the holes [D] in the ARDF and the stud screws [C], then slide the ARDF towards the front as shown.
   NOTE: When mounting the ARDF, hold it by hand as shown in the illustration. Holding it in another way may damage the ARDF.
5. Screw the two stud screws [E] into the holes [F] and tighten them.
6. Connect the connectors [G] into the socket on the rear of the copier.
7. Attach the symbol explanation decal [H], the combine originals explanation decal [I], and the caution decal [J] which comes with the copier to the ARDF as shown.

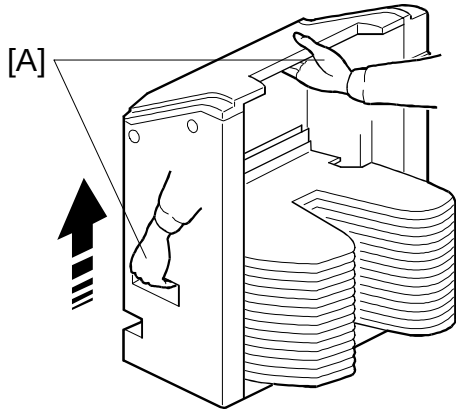
3.6 20-BIN SORTER STAPLER (A834)

3.6.1 ACCESSORY CHECK

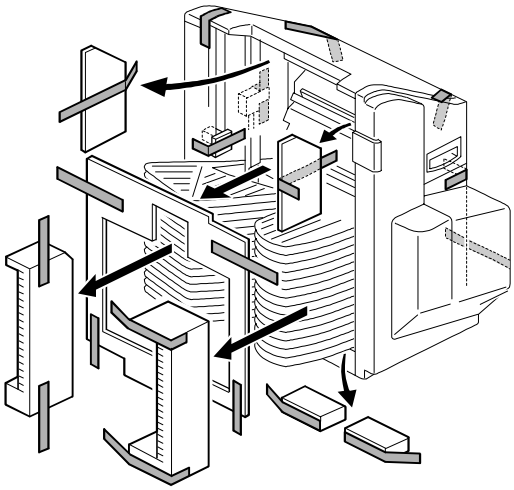
Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. Staple Position Decal	1
2. Chain	1
3. Cap Remover	1
4. Stepped Screw	6
5. Installation Procedure	1

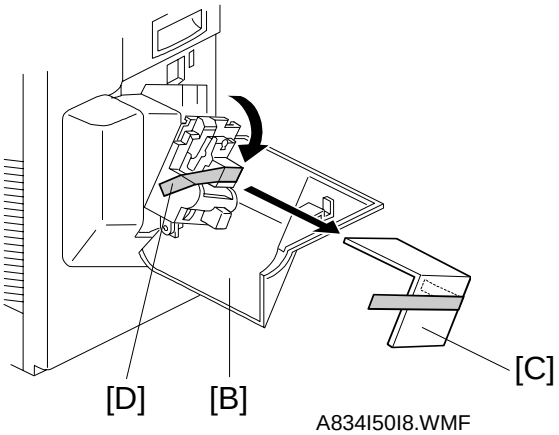
3.6.2 INSTALLATION



A834I500.WMF



A834I501.WMF



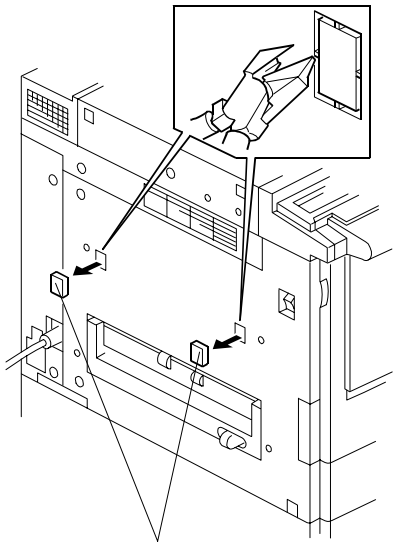
A834I50I8.WMF

⚠CAUTION

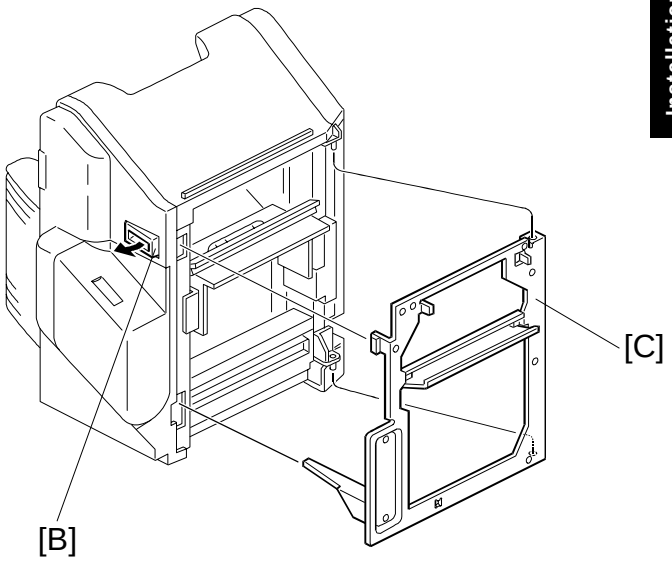
Unplug the copier power cord before starting the following procedure.
When handling the sorter stapler, make sure to hold the parts shown [A].
Otherwise, the resulting damage may cause paper jams at the entrance.

NOTE: 1) Keep the shipping retainers after installing the machine. They will be reused if the machine will be transported to another location.
2) Proper reinstallation of the shipping retainers is required in order to avoid any transport damage.

1. Remove the strips of tape and the shipping retainers, as shown.
2. Open the front door [B] and remove the pieces of cardboard [C] and the strip of tape [D] from the staple unit. Close the front door.

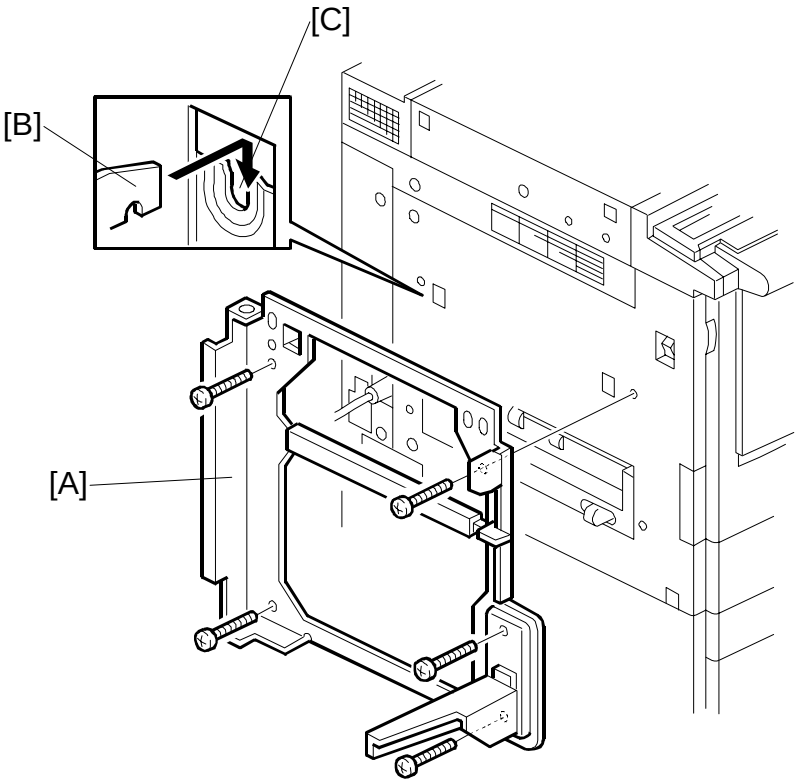


A834I504.WMF



A834I503.WMF

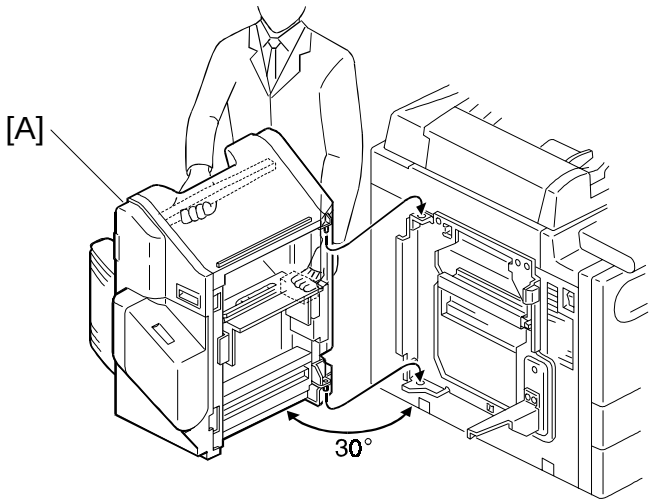
3. Remove the two plastic caps [A] from the copier left cover with nippers or a small screw driver.
4. Release lever [B] on the sorter stapler and remove the sorter stapler mounting frame [C], as shown.



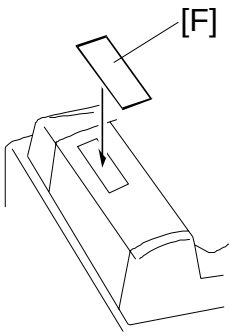
A834I502.WMF

5. Mount the sorter stapler mounting frame [A] on the copier, as shown (5 screws M4 x 20).

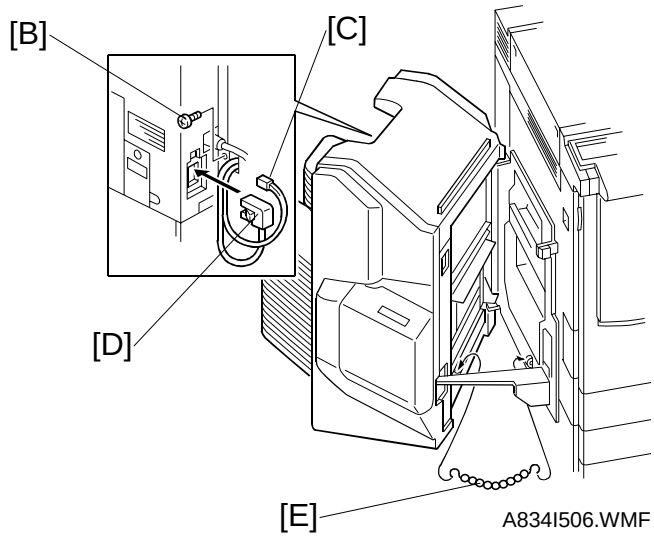
   When hooking the sorter stapler mounting frame on the left side of the copier, make sure that the positioning hooks [B] on the frame are properly inserted in the positioning holes [C] in the copier.



A834I505.WMF



A834I507.WMF



A834I506.WMF

6. Install the sorter stapler [A] on the frame (2 hinge pins at the rear), as shown.
7. Tighten the M4 x 20 screw [B].
   NOTE: This screw prevents the sorter stapler from falling down.
8. Connect the cable [C] and the optic cable [D].
9. Install the chain [E] as shown.
10. Attach the staple position decal [F], as shown.
11. Plug in the copier.
12. Turn on the main switch of the copier and test the operation of the sorter stapler.
    NOTE: The copier automatically recognizes that the sorter stapler has been installed.

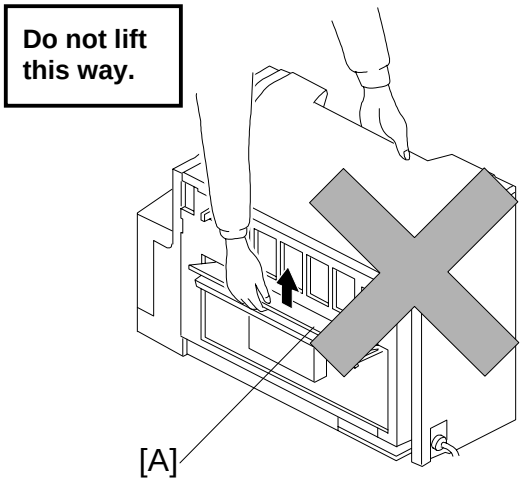
3.7 10-BIN SORTER STAPLER (A555)

3.7.1 ACCESSORY CHECK

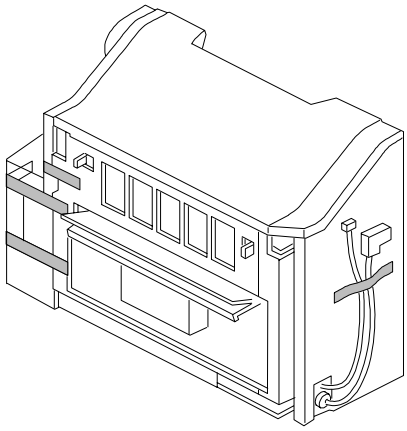
Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. Misfeed Removal Decal	1
2. Staple Position Decal	1
3. Chain	1
4. Cap Remover	1
5. Philips Pan Head Screw 4 x 8	1
6. Philips Pan Head Screw 4 x 14	4
7. New Equipment Condition Report	1
8. Installation Procedure	1

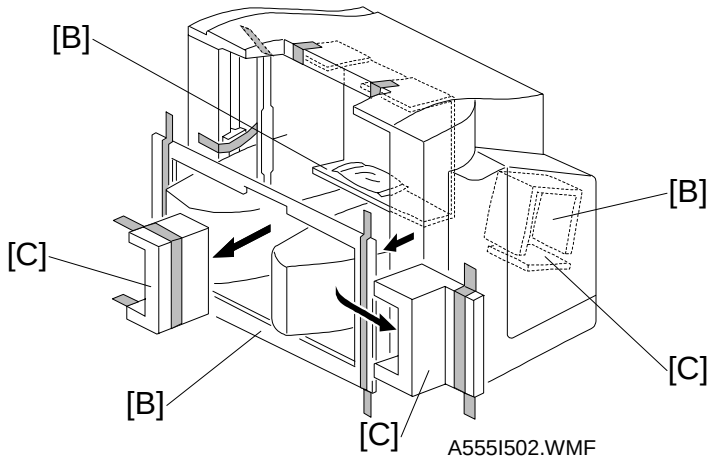
3.7.2 INSTALLATION



A555I500.WMF



A555I501.WMF

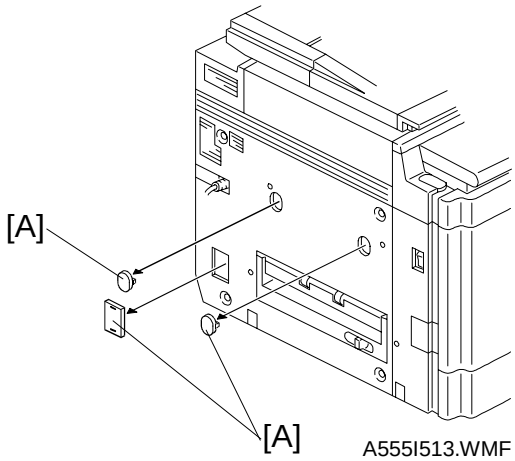


A555I502.WMF

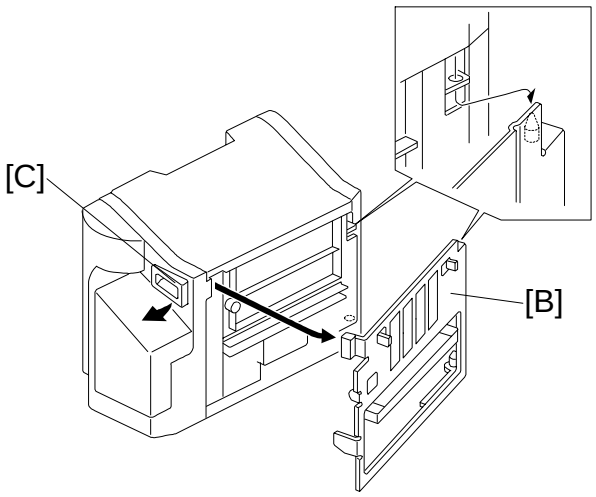
⚠CAUTION

Unplug the copier power cord before starting the following procedure.
Do not lift the sorter stapler by holding the entrance guide [A]. Otherwise, the resulting damage may cause paper jams to occur at the entrance.

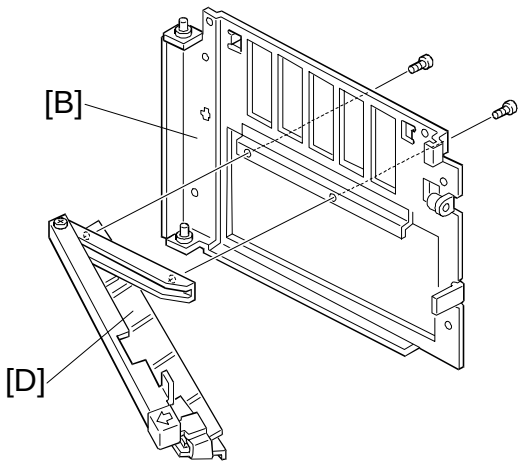
1. Remove the strips of tape.
2. Remove the cardboard pieces [B] and the foam blocks [C].



A555I513.WMF

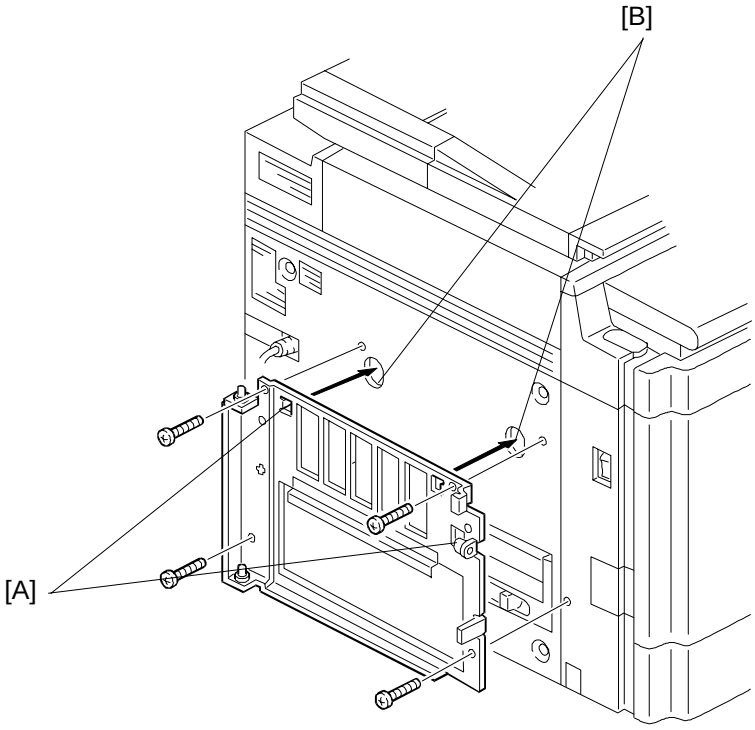


A555I504.WMF

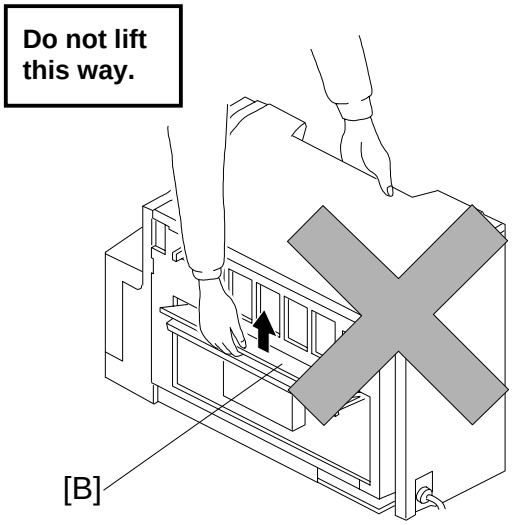


A555I522.WMF

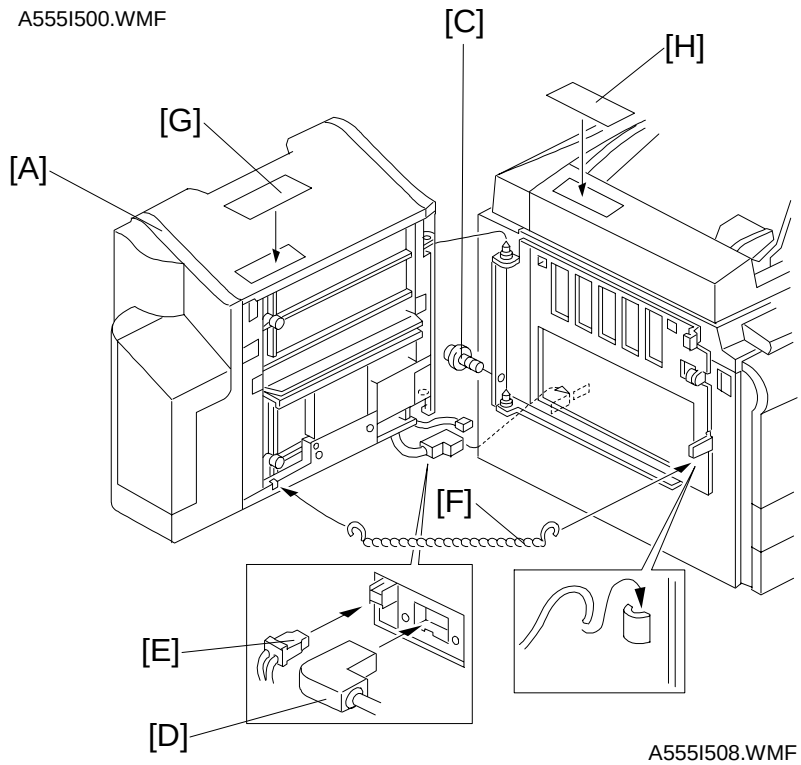
3. Remove the caps [A] with nippers, and remove the mounting frame [B] from the sorter stapler by releasing the lever [C].
4. Remove the exit paper guide [D] from the mounting frame [B].



5. Fit the hooks [A] on the sorter stapler mounting frame into the holes [B]. Then tighten four M4 x 14 screws.

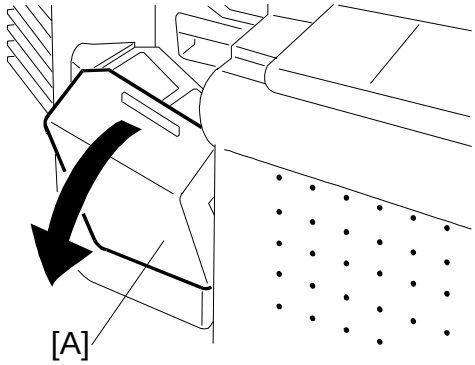


A555I500.WMF

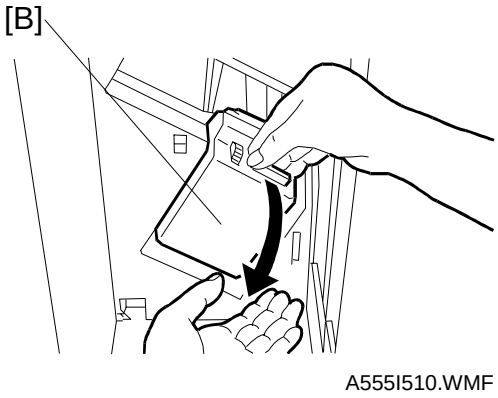


A555I508.WMF

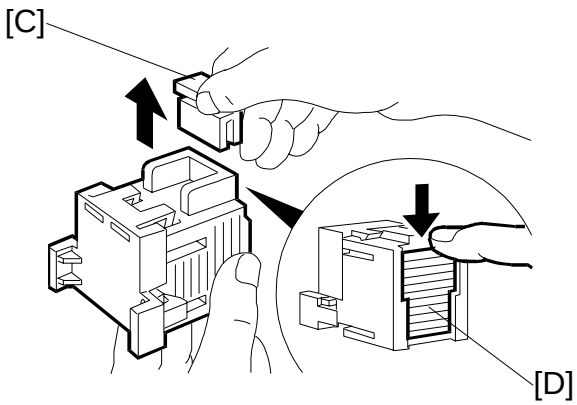
6. Install the sorter stapler [A] on the frame (1 screw M4 x 8).
   NOTE: Do not lift the sorter stapler by holding the entrance guide [B] when installing it.
7. Tighten the M4 x 8 screw [C].
   NOTE: This screw prevents the sorter stapler from falling down.
8. Connect the cable [D] and the optic cable [E].
9. Install the chain [F] as shown.
10. Attach the misfeed removal decal [G] and the staple position decal [H] as shown above.



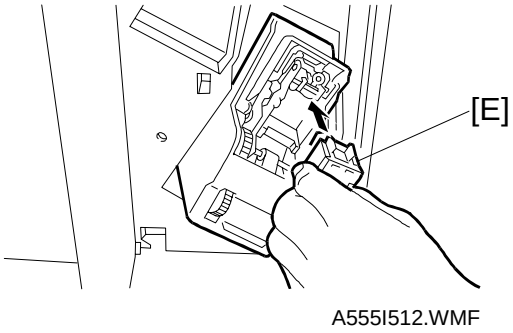
A555I509.WMF



A555I510.WMF



A555I511.WMF



A555I512.WMF

11. Open the front door [A] of the sorter stapler and swing the stapler unit [B] down.
12. Remove the green plastic clip [C] from the staple cartridge and correct the position of the staple sheet [D] if necessary.
13. Install the cartridge [E] in the stapler while holding the stapler unit.
14. Put the stapler unit back to the original position, close the sorter stapler front door, and plug in the copier.
15. Turn on the main switch, and test the operation of the sorter stapler.
    NOTE: The stapler will not be stapling for the first 5 or so copies until the first staple comes to the proper position from the cartridge.

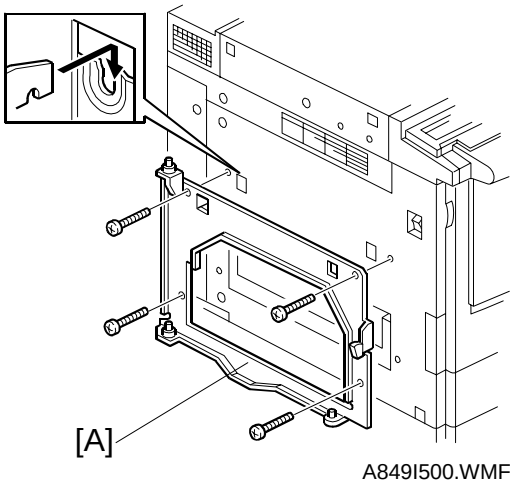
3.8 3-BIN SORTER (A849)

3.8.1 ACCESSORY CHECK

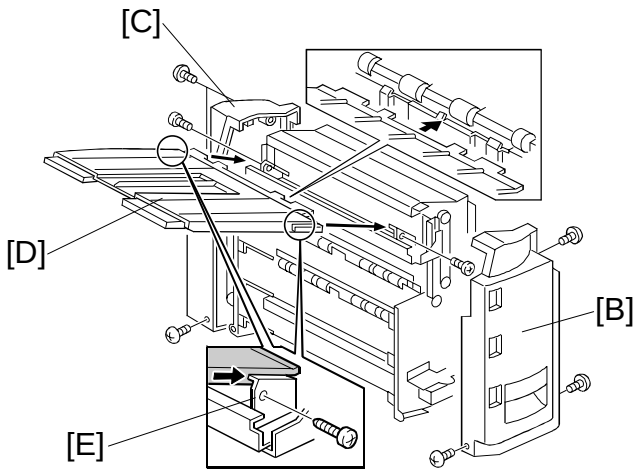
Check the quantity and condition of the accessories in the box against the following list.

Description	Q'ty
1. Installation Procedure	1
2. Connecting Bracket	1
3. Arm Bracket	1
4. Copy Tray	4
5. Decal - Paper Size Detector	1
6. Tapping Screw - M4X10	2
7. Snap Ring	1
8. Shoulder Screw	1

3.8.2 INSTALLATION



A849I500.WMF



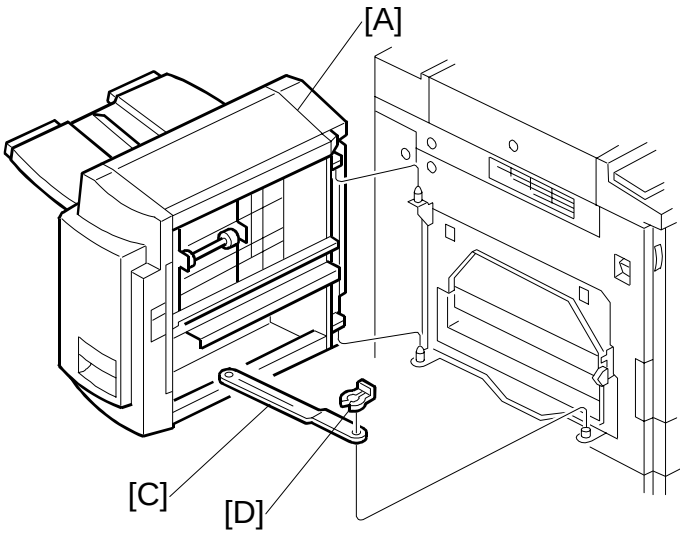
A566I503.WMF

⚠CAUTION

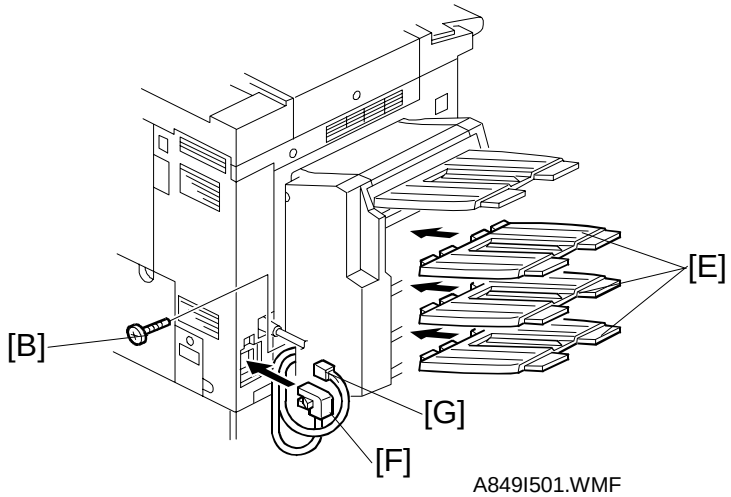
Unplug the copier power cord before starting the following procedure.

1. Remove the strips of tape.
2. Remove the connecting bracket from the side of the sorter.
3. Remove the two caps from the copier left cover with nippers or a small screwdriver.
4. Install the connecting bracket [A] as shown (4 screws).
5. Remove the front cover [B] (3 screws) and rear cover [C] (3 screws).
6. Install the tray [D] with 2 tapping screws – M4 x 10.

NOTE: When you install the tray, make sure it is flush with the metal brackets as shown [E]. If it is not flush, the stack height sensor will not detect the upper position of the bin correctly. Then the machine might display SC732 (tray lift motor error).



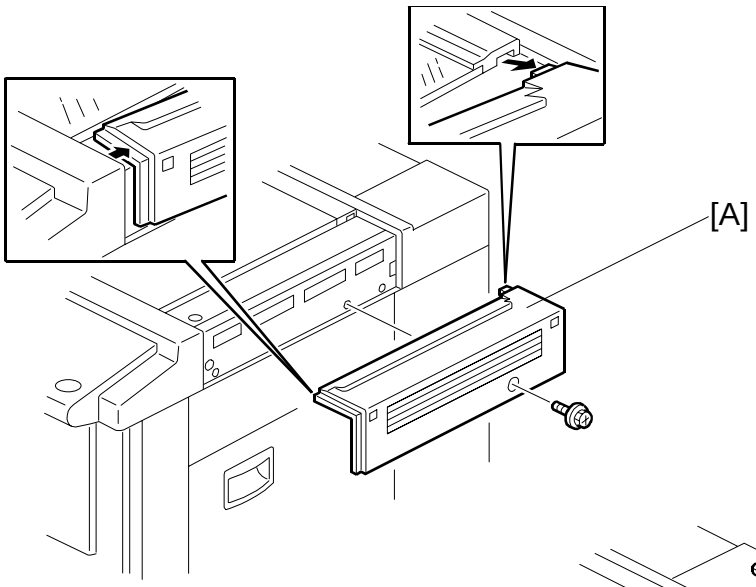
A849I504.WMF



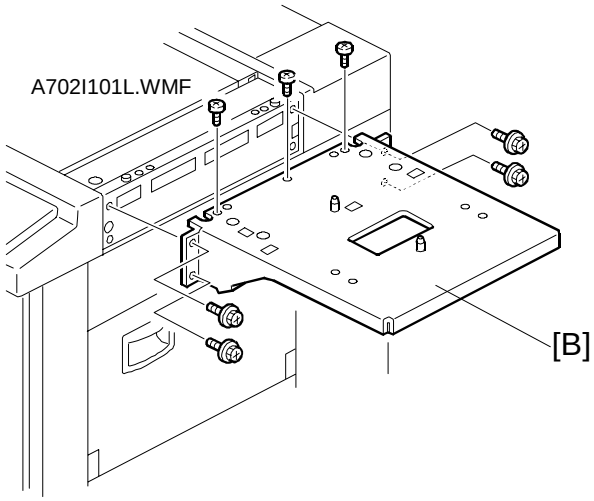
A849I501.WMF

7. Install the sorter unit [A] on the frame.
8. Install the shoulder screw [B] to lock the sorter unit in place.
9. Mount the arm bracket [C] with 1 clip [D].
10. Install the trays [E].
11. Reinstall the front and rear covers.
12. Connect the cable [F] and the optic cable [G].
13. Turn the copier's main switch on and check the sorter operation.

3.9 FILM PROJECTOR TABLE (A702-19)

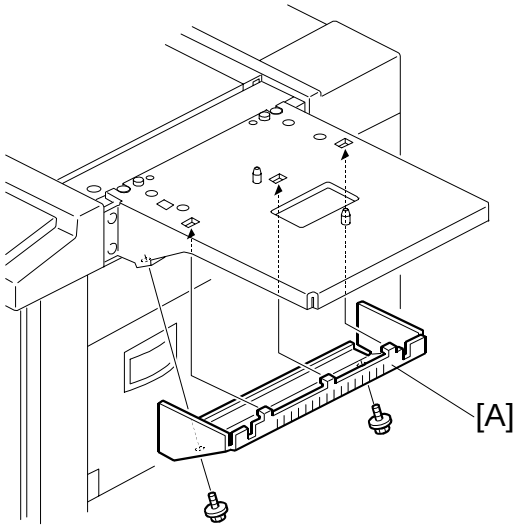


A702I101L.WMF

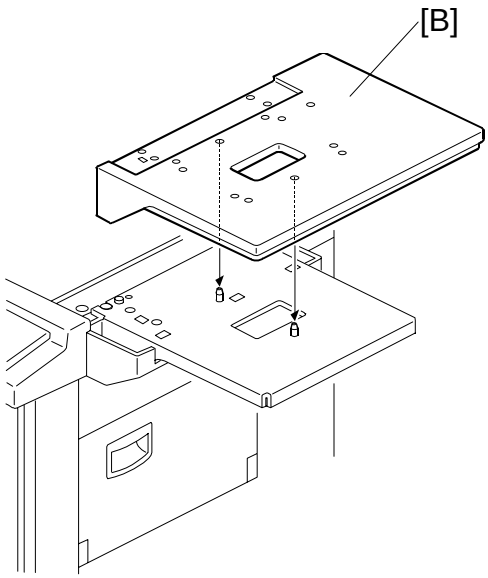


A702I102L.WMF

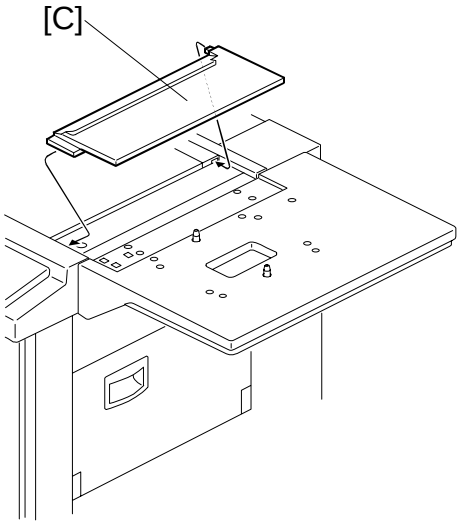
1. Remove the upper right cover [A] (1 screw).
2. Install the table [B] (7 screws).



A702I103L.WMF



A702I104L.WMF



A702I105L.WMF

3. Install the lower cover [A] (2 screws).
4. Install the table cover [B].
5. Install the joint cover [C].

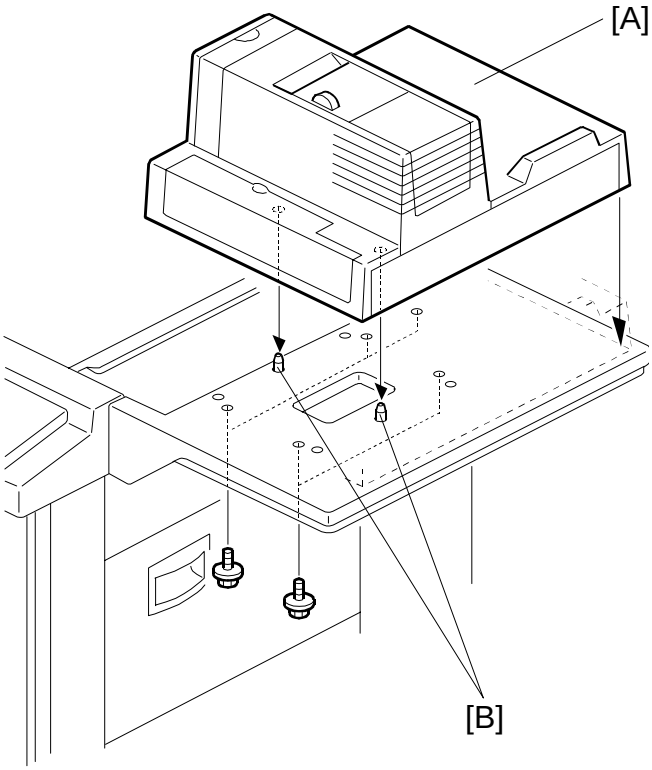
3.10 FILM PROJECTOR UNIT (A846)

3.10.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. Mirror Unit	1
2. Power Cord	1
3. Film Strip Holder	1
4. Slide Holder	1
5. Glass Mount Holder	1
6. Base Film (Fuji, Kodak, Agfa)	3
7. Slide Mount	1
8. Correction Filter (P, N)	2
9. Blower Brush	1
10. Projection Lamp	1
11. Film Position Sheet	2
12. Philips Pan Head Screw –M3 x 12	5
13. Installation Procedure	1

3.10.2 INSTALLAITON

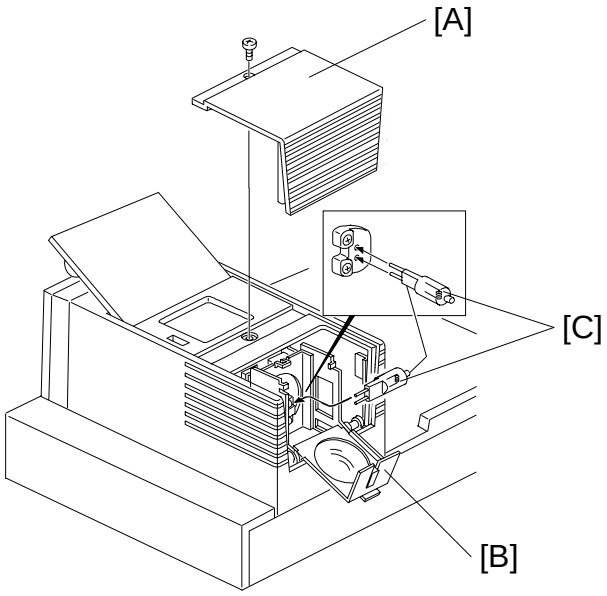


A846I509.WMF

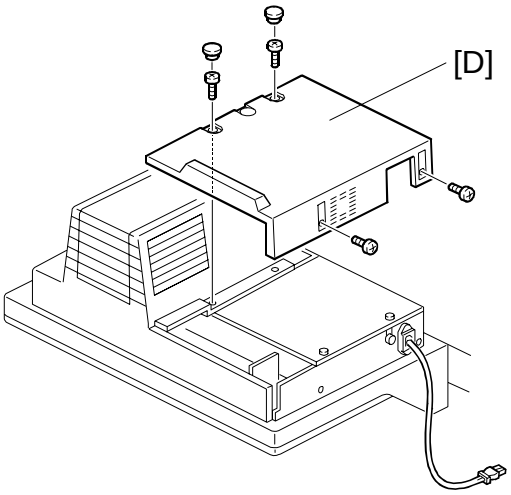
⚠CAUTION
Unplug the copier power cord before starting the following procedure.

NOTE: The film projector table (A702-19) must be installed before starting the following procedure.

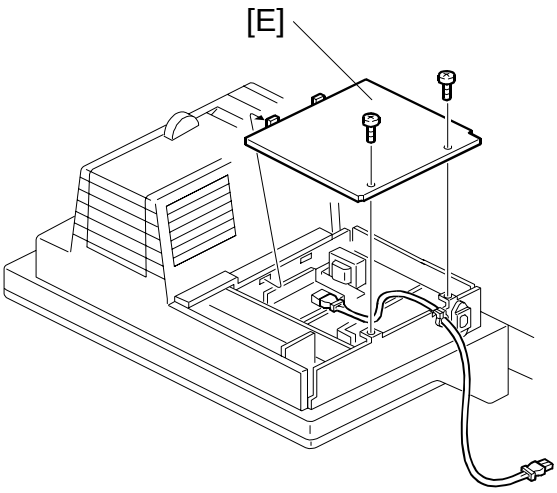
1. Place the projector unit [A] on the table by aligning the holes in the projector base plate with the positioning pins [B]. Then secure the projector unit with five M3 x 12 screws.



A846I500.WMF

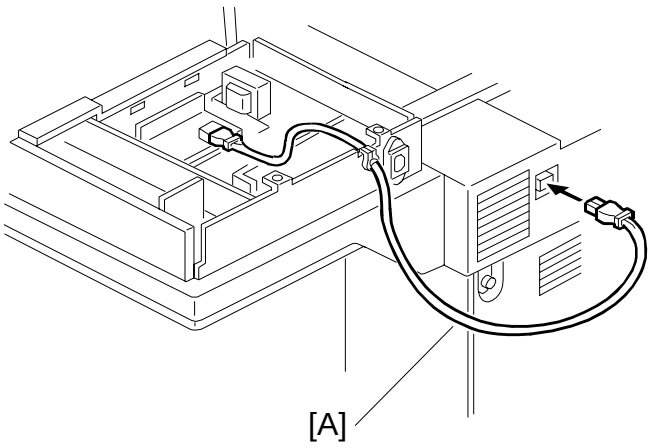


A846I510.WMF

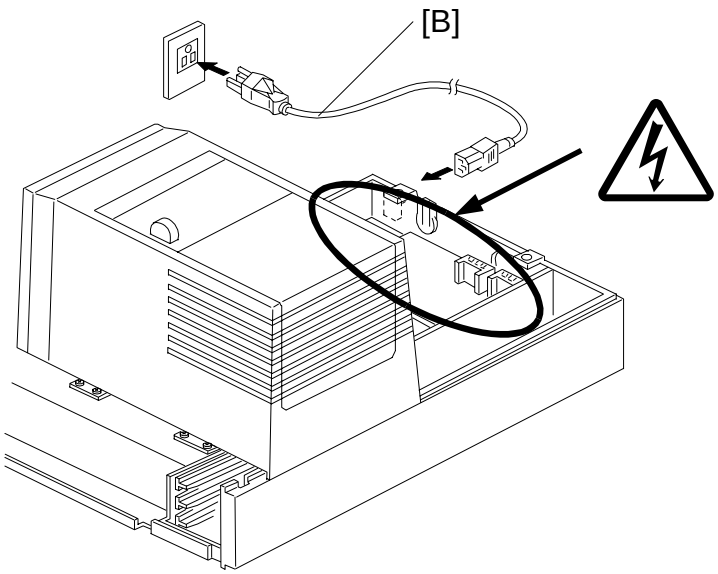


A846I511.WMF

2. Remove the lamp cover [A] (1 screw) and open the reflector cover [B]. Then, plug the projector lamp [C] into the socket. Then close the reflector cover.
   NOTE: The projector lamp should be inserted horizontally until it stops.
3. Remove the cover [D] (2 rubber caps, 4 screws).
4. Remove the inner cover [E] (2 screws).



A846I513.WMF

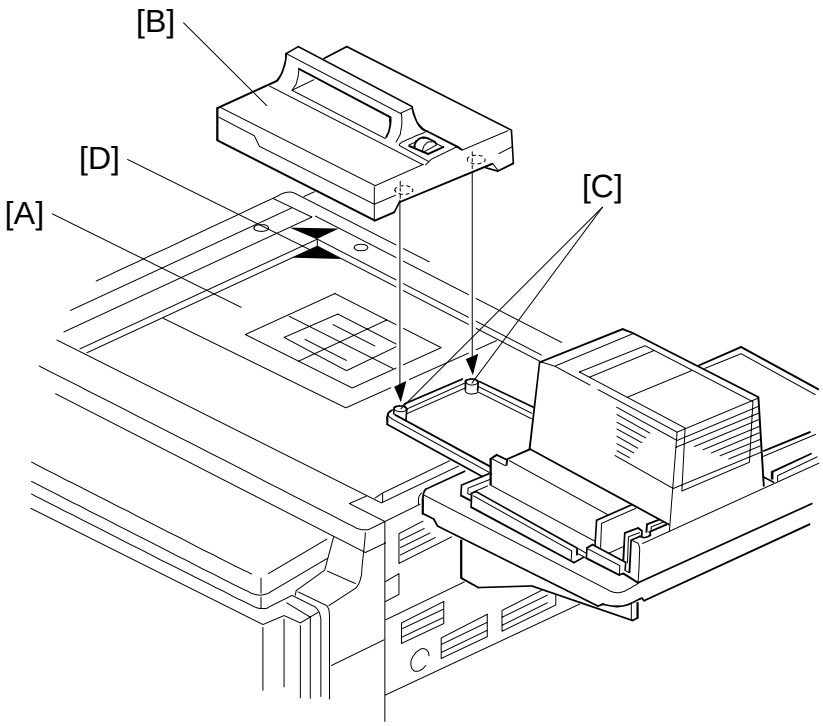


A846I501.WMF

5. Connect the optical fiber cable [A] to the copier.
6. Connect the power cord [B] to the power inlet and plug it into the wall outlet.

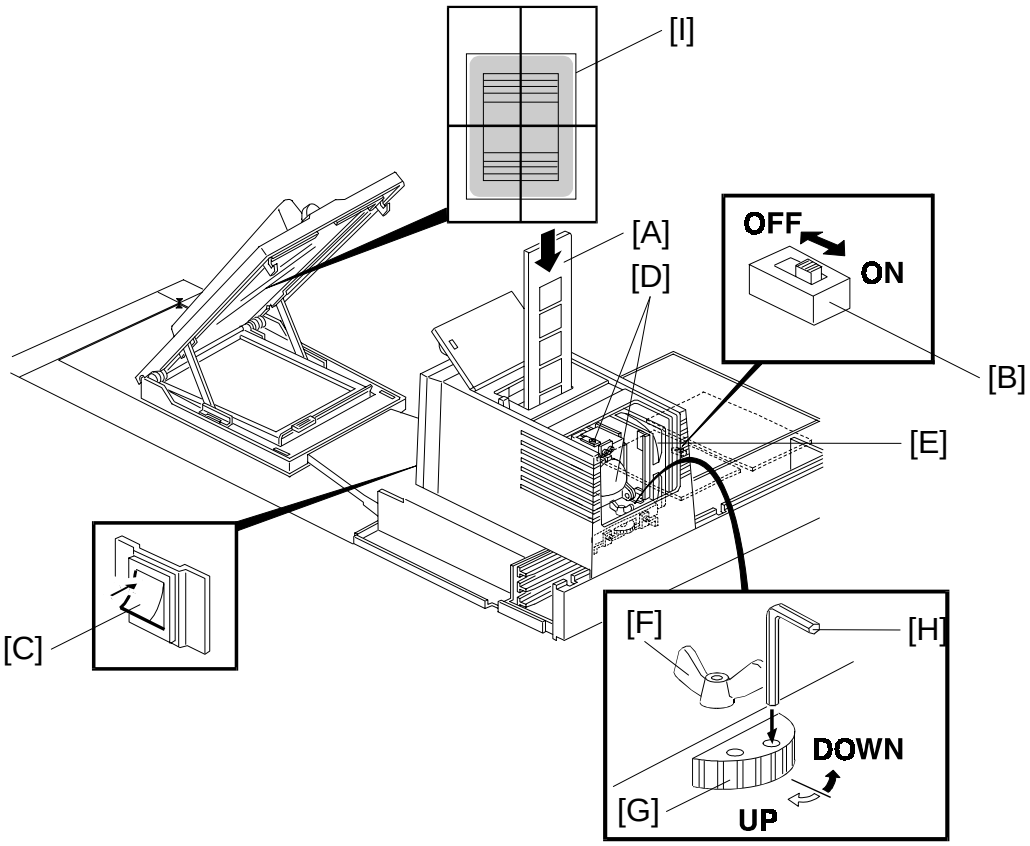
⚠WARNING

After plugging the power cord into the wall outlet, do not touch the electrical components inside the projector unit. Otherwise, you might receive an electrical shock. ⚠



A846I502.WMF

7. Place the film position sheet [A] on the exposure glass, aligning it at the rear left corner.
   NOTE: “D” is written at the corner mark [D] on the film position sheet for the A258/A259/A260 copiers.
8. Put the mirror unit [B] on the exposure glass by aligning the holes with the positioning pins [C] on the lens cover.



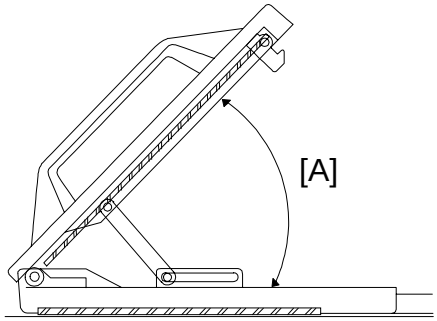
A846I503.WMF

9. Set the film strip holder [A] into the film projector unit at the base film setting position.
   NOTE: Push the film strip holder lightly to confirm that the film strip holder is set correctly.
10. Turn on the test switch [B] on the projector control board and turn on the projector unit main switch [C].

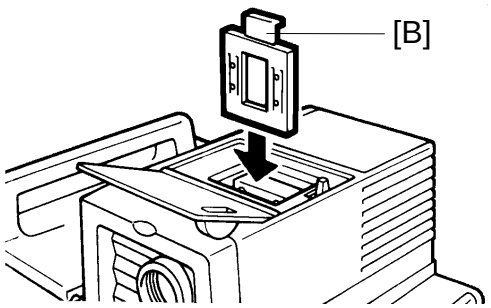
⚠CAUTION

The lamp housing and reflector [D] will become very hot. The lamp cooling fan [E] will start turning suddenly when the lamp housing temperature becomes high. Keep hands away from these components to avoid any injury.

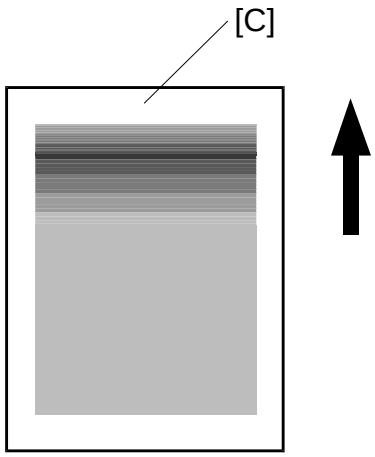
11. Loosen the wing nut [F].
12. Adjust the position of the projected light by turning the dial [G] with a hexagon wrench [H] until it is at the center of the 4" x 5" frame [I] which is reflected in the mirror unit.
13. Tighten the wing nut [F].
14. Turn off the projector main switch and the test switch.
15. Reinstall the lamp cover and other covers.



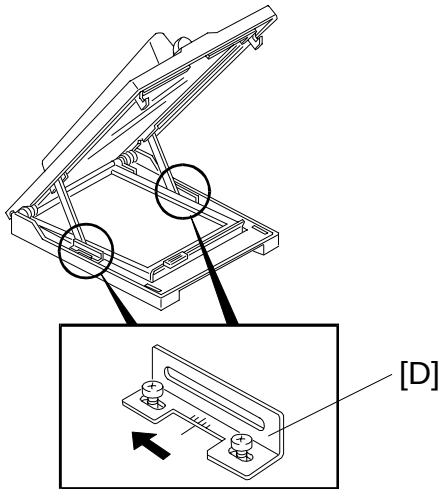
A846I504.WMF



A846I505.PCX

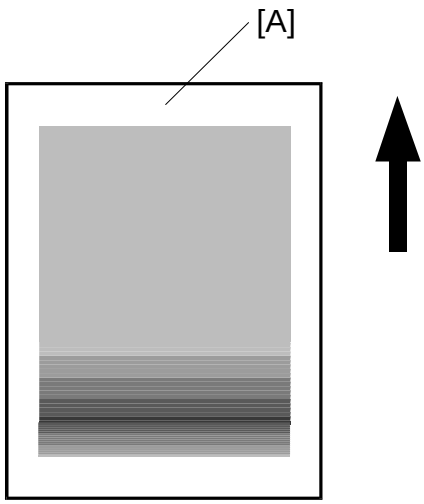


A846I507.WMF

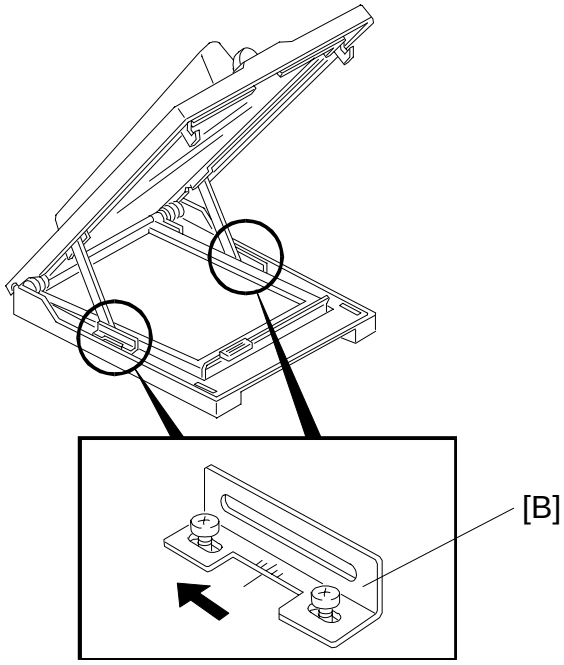


A846I506.WMF

16. Adjust the angle [A] of the mirror unit as follows:
    1) Turn on the copier main switch and wait for the ready condition.
    2) Open the lens cover and position the mirror unit on the exposure glass.
    3) Set the correction filter [B] for positive films in the filter slot.
    4) Turn on the projector main switch and press the Option key.
    5) Perform shading using the positive 35 mm slides mode.
    6) Set one of the orange base films in the slide holder and position it in the projector unit.
    7) Make a copy of the orange film.
    8) Check if the orange image is even or not. If the image is uneven, adjust the mirror angle as follows:
        8-1) When the leading part is dark [C].
            a) Move the front and rear arm guides [D] to the left so that the mirror angle is increased (2 screws each).
                NOTE: Position the arm guides at the same location at front and rear, using the ruler decals. This prevents the mirror from being twisted.
            b) Make a copy of the orange film.
            c) Repeat a) and b) until the orange image becomes even.



A846I508.WMF



A846I506.WMF

8-2) When the trailing part is dark [A].

a) Move the front and rear arm guides [B] to the **right** so that the mirror angle is increased (2 screws each).

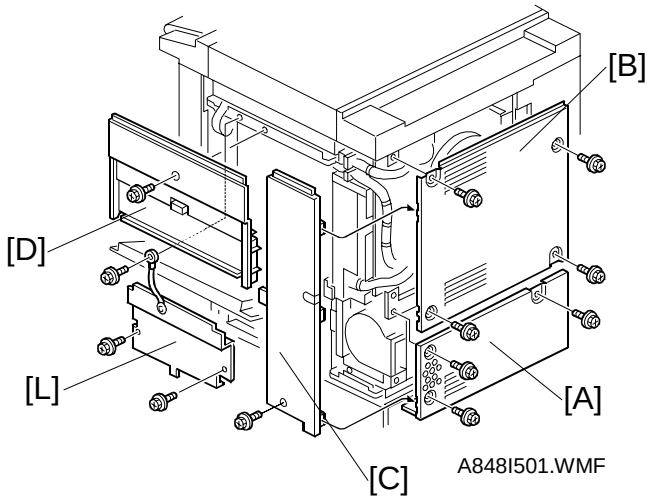
NOTE: Position the arm guides at the same location at front and rear, using the ruler decals. This prevents the mirror from being twisted.

b) Make a copy of the orange film.

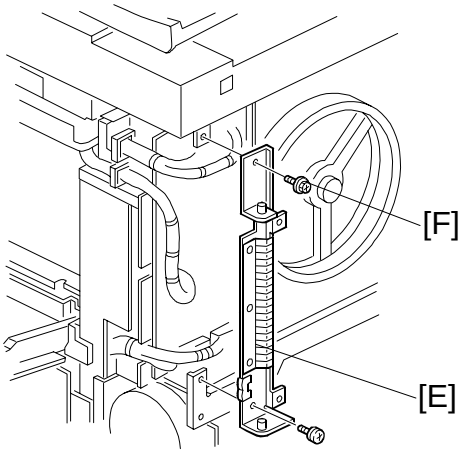
c) Repeat a) and b) until the orange image becomes even.

17. Check some copies made from positive or negative films.

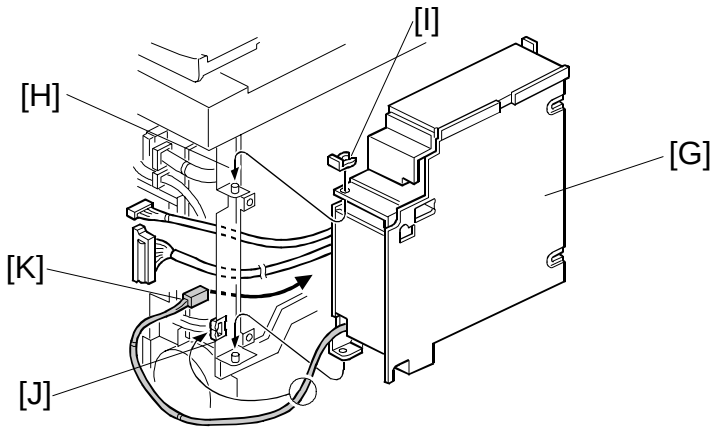
3.11 CONTROLLER INTERFACE TYPE E (A848)



A848I501.WMF



A848I502.WMF



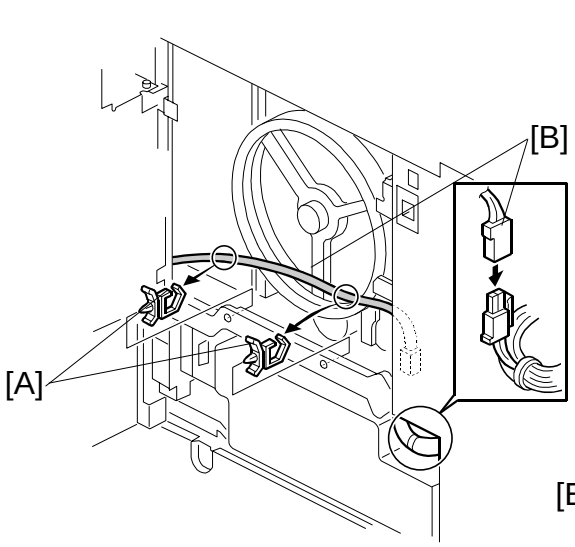
A848I503.WMF

⚠CAUTION

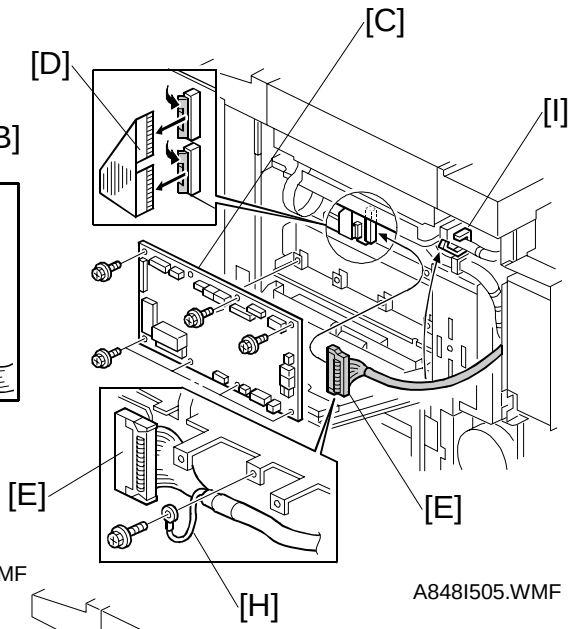
Unplug the copier power cord before starting the following procedure.

1. Remove the lower rear cover [A] (3 screws).
2. Remove the upper rear cover [B] (4 screws).
3. Remove the rear right cover [C] (1 screw).
4. Remove the right cover [D] (1 screw).
5. **A259/A260 only:** Remove the shield cover [L] (3 screws).
6. Attach the I/F bracket [E] to the right rear side of copier (1 screw, 1 screw with washer [F]).
7. Attach the I/F unit [G] to the I/F bracket [H] (1 snap ring [I]).

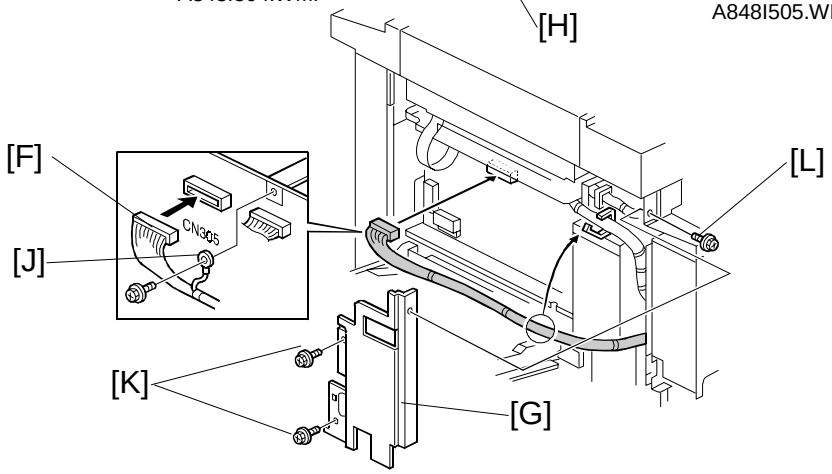
NOTE: Route the power supply cord [K] to the rear side of copier (1 clamp [J]).



A848I504.WMF



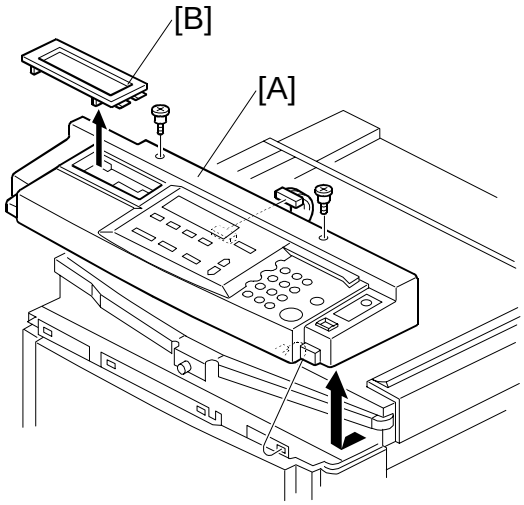
A848I505.WMF



A848I506.WMF

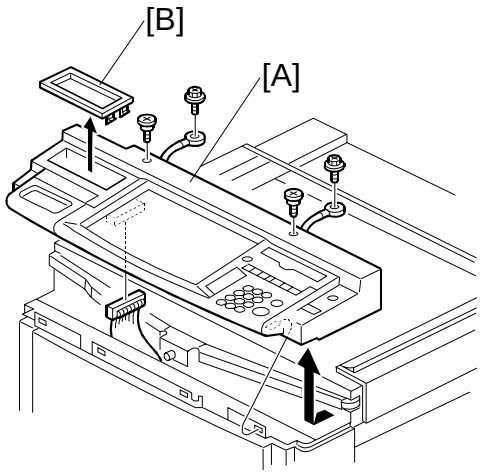
8. Attach 2 clamps [A] to the rear bracket of the copier.
9. Connect the power supply cord [B].
10. Remove the main board [C] (A258: 11 connectors and 7 screws, A259/A260:14 connectors and 7 screws).
11. Remove the shorting cable [D].
    NOTE: Store this cable somewhere inside the machine because it may be needed again.
12. Connect the 100 pin shield cable [E] to the LD main board (1 grounding wire [H], 1 clamp [I]).
13. Reinstall the main board [C] (13 connectors, 7 screws).
14. Connect the I/F cable [F] to CN305 on the main board and clamp it as shown (1 grounding wire [J] and 1 clamp).
15. Install the cable shield plate [G] (2 M4 x 6 screws [K] and 1 M3 x 6 screw [L]).

– A258 only –

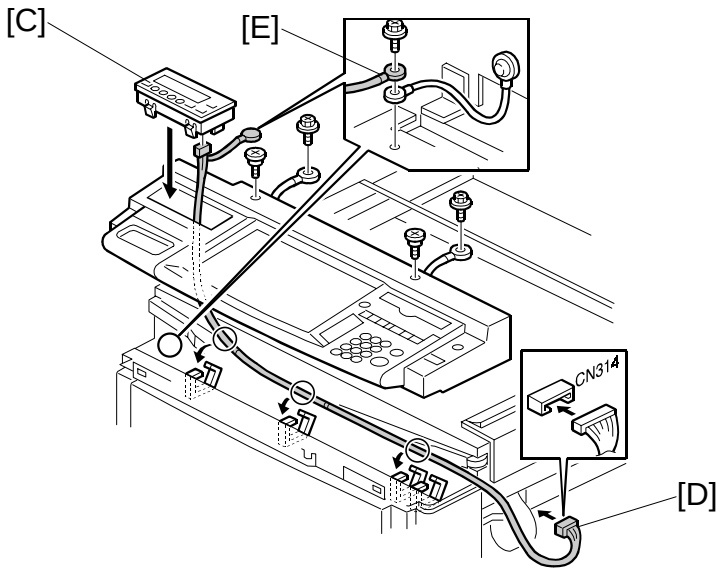


A848I512.WMF

– A259/A260 only –

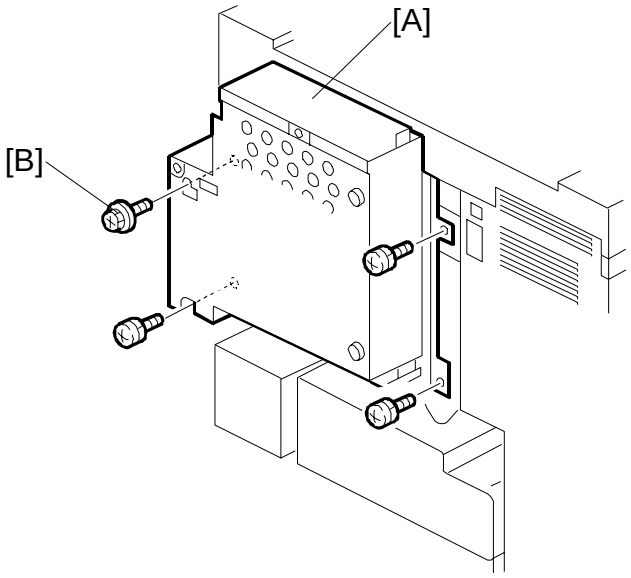


A848I511.WMF

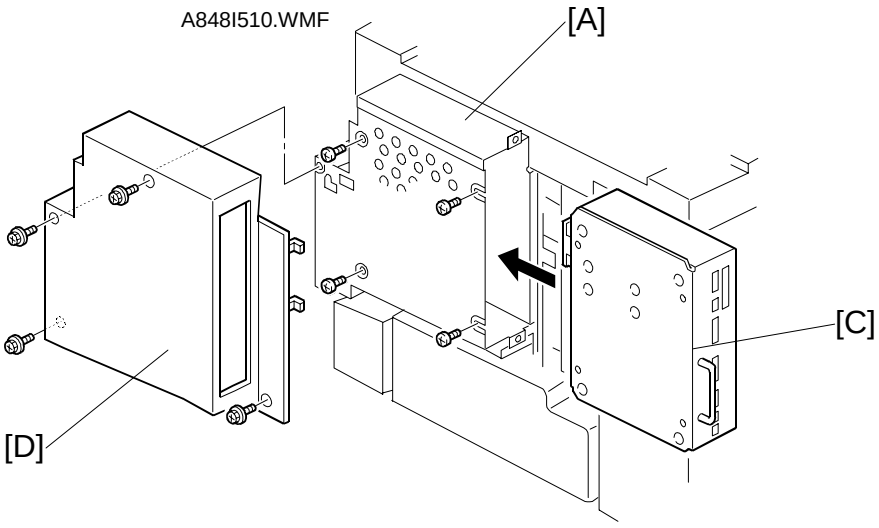


A848I508.WMF

16. Remove the operation panel [A] (A258: 2 screws, 1 connector and 1 grounding wire (European model), A259/260: 2 screws, 2 connectors, 2 grounding wires, and 1 flat cable).
17. Remove the LCD cover [B].
18. Install the LCD panel [C].
19. Connect the LCD cable [D] to the LCD panel and CN314 on the main board and clamp it (3 clamps, 1 grounding wire [E]).



A848I510.WMF



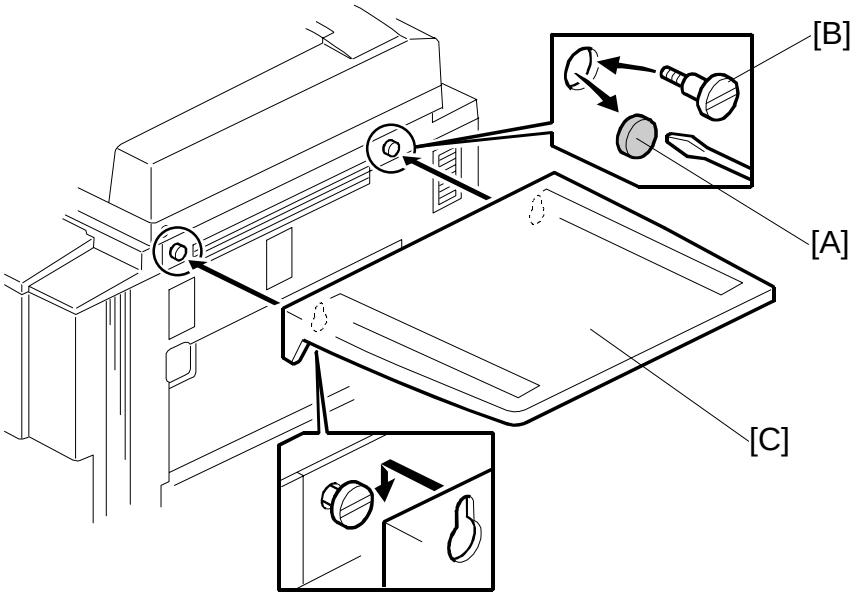
A848I509.WMF

20. Secure the I/F unit [A] to the copier (3 screws, 1 screw with washer [B]).
21. Install the printer controller [C] in the I/F unit [A]. (4 screws)
22. Reinstall the operation panel (2 screws), the right cover (1 screw), and rear right cover (1 screw).
23. Install the I/F cover [D] (4 screws).
24. Reinstall the lower rear cover (3 screws).

NOTE: When the machine is equipped with an ARDF, install the clamp from the interface kit accessories on the top of the interface cover [D] to prevent the fibre optic cable from being cut.

3.12 OTHERS

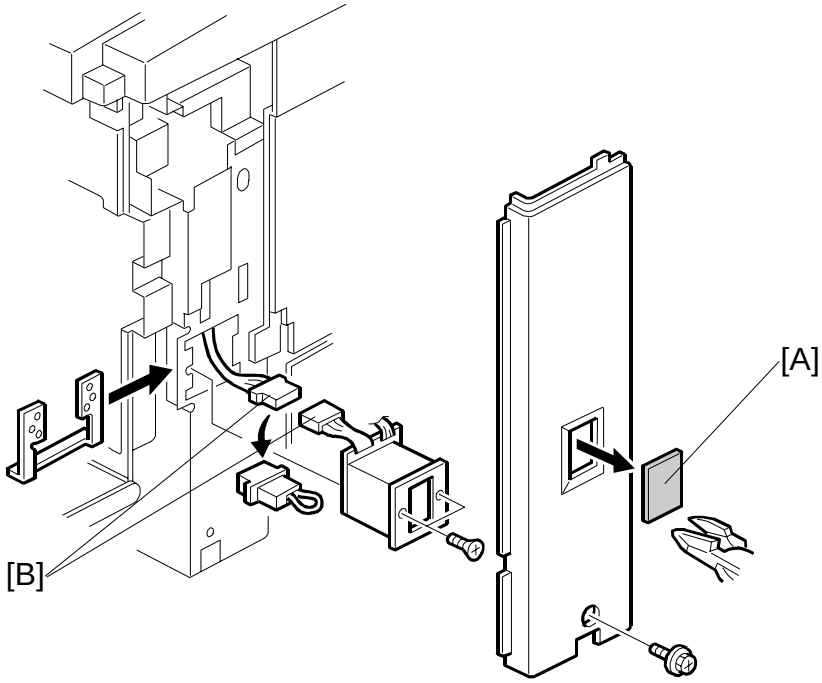
3.12.1 ORIGINAL TABLE INSTALLATION PROCEDURE



A259I505.WMF

1. Remove two caps [A] from the main unit cover.
2. Insert the shoulder screws [B]. Do not tighten them yet.
3. Mount the original table [C] so that it hangs on the shoulder screws.
4. Tighten the shoulder screws.

3.12.2 KEY COUNTER HOLDER INSTALLATION PROCEDURE



A259R418.WMF

1. Remove the right front cover from the main unit (1 screw).
2. Cut away a section [A].
3. Plug in the connector [B] for the key counter holder.
4. Secure the key counter holder on the main unit (2 screws).
5. Replace the right front cover (1 screw).
6. To enable the key counter function, enter ”2” in SP5-113.

4. SERVICE TABLES

4.1 SERVICE PROGRAM (SP) MODES

4.1.1 HOW TO ENTER SP MODE

Follow the procedure shown below to enter SP mode.

1) Press the clear modes key and enter 107.

2) Then hold down the clear/stop key for more than 3 seconds.

A service program number is composed of first, second, and third level numbers (Class 1, Class 2, and Class 3). Class 1 is 1 digit and the other classes are 3 digits. You can enter the complete 7-digit number with the numeric keypad and the enter key to display an SP mode menu directly. You can also use the selection keys under the LCD to change the class and to select a menu item.

Reference

Use the key when making a copy in an SP mode. To return to SP mode after making a copy, press the key again.

4.2 SP MODE TYPES

The SP modes for this copier are divided into the following seven groups:

1. Paper feed/transport/fusing
2. Drum unit
3. Process control
4. Scanner
5. Operating mode/system
6. Peripheral
7. Logged data
8. Special mode set-up

4.3 SP MODE TABLE

See Appendix 2.

4.4 SP MODE ADDITIONAL NOTES

4.4.1 SP5-804 OUTPUT CHECK

No. for Class 3	Load Name	Actual Display	A258	A259/A260
001	Drum motor, standard speed, forward	DRUM MT 1ST CW	ON=1, OFF=0	ON, OFF
002	Drum motor, half speed, forward	DRUM MT 2ND CW	ON=1, OFF=0	ON, OFF
003	Drum motor, standard speed, backward	DRUM MT 1ST CCW	ON=1, OFF=0	ON, OFF
004	Drum motor, 2/3 speed	DRUM MT 3RD CW	ON=1, OFF=0	ON, OFF
005	Fusing motor, standard speed	FUSER MT 1ST	ON=1, OFF=0	ON, OFF
006	Fusing motor, half speed	FUSER MT 2ND	ON=1, OFF=0	ON, OFF
007	Fusing motor, 2/3 speed	FUSER MT 3RD	ON=1, OFF=0	ON, OFF
008	Paper feed motor, standard speed	PAPER FEED MT 1ST	ON=1, OFF=0	ON, OFF
009	Paper feed motor, half speed	PAPER FEED MT 2ND	ON=1, OFF=0	ON, OFF
010	Paper feed motor, 2/3 speed	PAPER FEED MT 3RD	ON=1, OFF=0	ON, OFF
014	High voltage supply board: T1 PCC	PCC BS	ON=1, OFF=0	ON, OFF
015	Quenching Lamp	QL	ON=1, OFF=0	ON, OFF
016	Charge corona/grid	MAIN GC	ON=1, OFF=0	ON, OFF
017	Development bias AC	DEV BS AC	ON=1, OFF=0	ON, OFF
018	Development bias DC	DEV BS DC	ON=1, OFF=0	ON, OFF
019	Development bias AC + DC	DEV BS AC DC	ON=1, OFF=0	ON, OFF
021	ID sensor LED	P SEN LED	ON=1, OFF=0	ON, OFF
022	Development clutch	DEV CL	ON=1, OFF=0	ON, OFF
023	Paper transfer positioning clutch	P TRNS SET CL	ON=1, OFF=0	ON, OFF
024	Fusing clutch	FUSER CL	ON=1, OFF=0	ON, OFF
025	Toner supply motor	TONER ADD MT	ON=1, OFF=0	ON, OFF
026	Revolver current during rotation	REV CRNT ROTA	ON=1, OFF=0	ON, OFF
027	Revolover current during development	REV CRNT DEV	ON=1, OFF=0	ON, OFF
028	Revolver current during standby	REV CRNT WAIT	ON=1, OFF=0	ON, OFF
029	Revolver 90-degree rotation	REV MT 90	ON=1, OFF=0	ON, OFF
030	Revolver 45-degree rotation	REV MT 45	ON=1, OFF=0	ON, OFF
035	Belt transfer bias	B TRNS BS	ON=1, OFF=0	ON, OFF
036	Belt cleaning clutch	BELT CLN SET CL	ON=1, OFF=0	ON, OFF
037	Lubricant brush clutch	SWEEP SET CL	ON=1, OFF=0	ON, OFF
041	Paper transfer bias	P TRNS BS	ON=1, OFF=0	ON, OFF
043	Polygon motor	PLY MT 600DPI	ON=1, OFF=0	ON, OFF
044	Power relay	PRT POWER RELAY	ON=1, OFF=0	ON, OFF
045	Fusing roller heater	FUSER UPPER HT	ON=1, OFF=0	ON, OFF
046	Pressure roller heater	FUSER LOWER HT	ON=1, OFF=0	ON, OFF
047	Rear cooling fan motor	MC FAN	ON=1, OFF=0	ON, OFF
048	Transport fan motor	FF FAN	ON=1, OFF=0	ON, OFF

No. for Class 3	Load Name	Actual Display	A258	A259/A260
049	Main exhaust fan motor	EXH FAN	ON=1, OFF=0	ON, OFF
050	Fusing fan motor, high speed	FUSER FAN H SPD	ON=1, OFF=0	ON, OFF
051	Fusing fan motor, half speed	FUSER FAN L SPD	ON=1, OFF=0	ON, OFF
053	Charge corona fan motor	PLY FAN	ON=1, OFF=0	ON, OFF
059	By-pass feed clutch	PF MAN CL	ON=1, OFF=0	ON, OFF
060	By-pass pick-up solenoid	PICK UP MAN SOL	ON=1, OFF=0	ON, OFF
063	1st tray paper feed clutch	PF 1ST CL	ON=1, OFF=0	ON, OFF
066	2nd tray paper feed clutch	PF 2ND CL	ON=1, OFF=0	ON, OFF
069	3rd tray paper feed clutch	PF 3RD CL	ON=1, OFF=0	ON, OFF
072	4th tray paper feed clutch	PF 4TH CL	ON=1, OFF=0	ON, OFF
075	1st tray lift motor, forward	TRAY UP 1ST MT UP	ON=1, OFF=0	ON, OFF
076	1st tray lift motor, backward	TRAY UP 1ST MT DOWN	ON=1, OFF=0	ON, OFF
077	2nd tray lift motor, forward	TRAY UP 2ND MT UP	ON=1, OFF=0	ON, OFF
078	2nd tray lift motor, backward	TRAY UP 2ND MT DOWN	ON=1, OFF=0	ON, OFF
079	3rd tray lift motor, forward	TRAY UP 3RD MT UP	ON=1, OFF=0	ON, OFF
080	3rd tray lift motor, backward	TRAY UP 3RD MT DOWN	ON=1, OFF=0	ON, OFF
081	4th tray lift motor, forward	TRAY UP 4TH MT UP	ON=1, OFF=0	ON, OFF
082	4th tray lift motor, backward	TRAY UP 4TH MT DOWN	ON=1, OFF=0	ON, OFF
086	Registration clutch	REG CL	ON=1, OFF=0	ON, OFF
087	Relay clutch	PF MID CL	ON=1, OFF=0	ON, OFF
088	Junction gate solenoid	SEP SOL	ON=1, OFF=0	ON, OFF
089	Duplex feed motor, forward, standard speed	DPLX FEED MT CW	ON=1, OFF=0	ON, OFF
090	Duplex feed motor, forward, 2/3speed	DPLX FEED MT 2P3CW	ON=1, OFF=0	ON, OFF
091	Duplex feed motor, backward, standard speed	DPLX FEED MT CCW	ON=1, OFF=0	ON, OFF
092	Duplex feed motor, backward, 2/3 speed	DPLX FEED MT 2P3CCW	ON=1, OFF=0	ON, OFF
093	Duplex side fence jogger motor, forward	DPLX SF MT CW	ON=1, OFF=0	ON, OFF
094	Duplex side fence jogger motor, backward	DPLX SF MT CCW	ON=1, OFF=0	ON, OFF
095	Duplex end fence jogger motor, forward	DPLX EF MT CW	ON=1, OFF=0	ON, OFF
096	Duplex end fence jogger motor, backward	DPLX EF MT CCW	ON=1, OFF=0	ON, OFF
097	PSU fan motor	EXHAUST FAN	ON=1, OFF=0	ON, OFF
100	Optics cooling fan motor	SCN FAN0	ON=1, OFF=0	ON, OFF
101	Scanner exhaust fan motor	SCN FAN1	ON=1, OFF=0	ON, OFF
104	Scanner motor	SCN REIGI OFF	ON=1, OFF=0	ON, OFF
105	Exposure lamp	SCN SP LAMP	ON=1, OFF=0	ON, OFF
106	Power relay : scanner	SCN PWR RELAY	ON=1, OFF=0	ON, OFF
107	FPU lamp	SCN SP FPU LAMP	ON=1, OFF=0	ON, OFF
120	Sorter main motor	SS PROOF MT	ON=1, OFF=0 SRC	ON, OFF SRC

No. for Class 3	Load Name	Actual Display	A258	A259/A260
124	Bin lift motor	SS BIN LIFT MT	ON=1, OFF=0 SRC	ON, OFF SRC
127	Grip motor	SS CHACK MT	ON=1, OFF=0 SR	ON, OFF SR
129	Stapler motor	SS STAPLER MT	ON=1, OFF=0 SR	ON, OFF SR
131	Jogger motor	SS JOGGER MT	ON=1, OFF=0 SR	ON, OFF SR
132	Tray shift motor	SS SIFT MT	ON=1, OFF=0 C	ON, OFF C
133	Junction gate solenoid	SS JOGGER MT	ON=1, OFF=0 C	ON, OFF C
134	2 bin gate solenoid	SS 2BIN SOL	ON=1, OFF=0 C	ON, OFF C
135	3 bin gate solenoid	SS 3BIN SOL	ON=1, OFF=0 C	ON, OFF C
150	ADF feed-in motor, forward	ADF IMOTOR F	ON=1, OFF=0	ON, OFF
151	ADF feed-in motor, backward	ADF IMOTOR R	ON=1, OFF=0	ON, OFF
152	ADF belt drive motor, forward	ADF BMOTOR F	ON=1, OFF=0	ON, OFF
153	ADF belt drive motor, backward	ADF BMOTOR R	ON=1, OFF=0	ON, OFF
154	ADF feed-out motor, forward	ADF OMOTER F	ON=1, OFF=0	ON, OFF
155	ADF inverter solenoid	ADF SOL	ON=1, OFF=0	ON, OFF
156	ADF display LED	ADF LED DIS	ON=1, OFF=0	ON, OFF

S : 10 BIN SORTER	R : 20 BIN SORTER	C : 3 BIN SORTER

4.4.2 SP5-803 INPUT CHECK

Printer

No. for Class 3	Sensor/Switch Name	Actual Display	Condition	
001	Drum motor lock	SEN DRUM MT LOCK		0 (Lock)
002	Fusing motor lock	SEN FUSER M LOCK		0 (Lock)
003	Paper feed motor lock	SEN PF MT LOCK		0 (Lock)
006	Polygon motor lock	SEN PLY MT LOCK	1 (Lock)	
009	Toner cartridge	SEN T CARTRIGE		0 (Set)
010	Toner end	SEN TE		0 (End)
011	Paper transfer home position	SEN BERT MARK	1 (Contact)	0 (Release)
012	Belt cleaning home position	SEN BTCLN POSTN	1 (Release)	0 (Contact)
013	Used toner	SEN DUST TONER	1 (Full)	0 (Adequate)
014	1st tray upper limit	SEN TRAY1 UP	1 (ON)	
015	2nd tray upper limit	SEN TRAY2 UP	1 (ON)	
016	3rd tray upper limit	SEN TRAY3 UP	1 (ON)	
017	4th tray upper limit	SEN TRAY4 UP	1 (ON)	
019	2nd vertical transport	SEN PAPER TX2		0 (PE)

No. for Class 3	Sensor/Switch Name	Actual Display	Condition	
020	3rd vertical transport	SEN PAPER TX3		0 (PE)
021	4th vertical transport	SEN PAPER TX4		0 (PE)
022	Relay	SEN PAPER TX1	1 (PE)	
023	1st tray paper end	SEN TRAY1 PE		0 (PE)
024	2nd tray paper end	SEN TRAY2 PE	1 (PE)	
025	3rd tray paper end	SEN TRAY3 PE	1 (PE)	
026	4th tray paper end	SEN TRAY4 PE	1 (PE)	
027	By-pass feed paper end	SEN MANFEED PE		0 (PE)
038	By-pass paper width detection SW 1	SEN SIZ SW MAN 1	1 (ON)	
039	By-pass paper width detection SW 2	SEN SIZ SW MAN 2	1 (ON)	
040	By-pass paper width detection SW 3	SEN SIZ SW MAN 3	1 (ON)	
041	By-pass paper width detection SW 4	SEN SIZ SW MAN 4	1 (ON)	
047	Paper height sensor 1	SEN STACK SW 1 1	1 (ON)	
048	Paper height sensor 2	SEN STACK SW 1 2	1 (ON)	
049	Paper tray detector switch	SEN TRAY1 SET		0 (Set)
051	By-pass feed table switch	SEN MANNFEED SET	1 (Open)	
052	Registration	SEN REGIST		0 (PE)
053	Duplex unit side fence jogger home position	SEN DPLX SIDE HP		0 (HP)
054	Duplex unit end fence jogger home position	SEN DPLX END HP		0 (HP)
055	Duplex entrance	SEN DPLX IN	1 (PE)	
056	Duplex turn	SEN DPLX RVS		0 (PE)
057	Duplex paper end	SEN DPLX PE		0 (PE)
058	Duplex unit set	SEN DPLX SET		0 (Set)
059	Paper exit	SEN FUSER EXIT	1 (PE)	
060	Fusing oil end	SEN OIL END		0 (End)
062	Front door switch	SEN FRONT DOOR		0 (Open)
063	Vertical transport switch	SEN BANK DOOR		0 (Open)
065	Paper exit door	SEN EXIT DOOR		0 (Open)
066	PCC leak	SEN PCC LEAK		0 (Leak)
067	Separation charge corona leak	SEN SEP CHG LEAK		0 (Leak)
068	Charge corona leak	SEN MAIN CH LEAK		0 (Leak)
072	Key counter	SEN KEY COUNTER		0 (OK)
073	Key card	SEN KEY CARD		0 (OK)
074	Counter check 1	SEN ELC CHECK1		0 (Check)
075	Counter check 2	SEN TOTAL CNT2		0 (Check)
076	2nd tray detector switch	SEN TRAY2 SET	1 (Set)	
077	3rd tray detector switch	SEN TRAY3 SET SEN	1 (Set)	
078	4th tray detector switch	SEN TRAY4 SET SEN	1 (Set)	

Scanner

No.for Class 3	Sensor/Switch Name	Actual Display	Condition	
100	Scanner home position	HOME SENCER	1 (Set)	
101	Platen cover position	ATSUBAN SENSER	1 (Set)	

Sorter

No. for Class 3	Name	Actual Display	Sorter type	Condition	
120	Entry	SEN SS ENTER SEN	C	1 (Paper empty)	
121	Proof (1 bin paper exit)	SEN SS PROOF EX SEN	C		0 (Paper empty)
122	Entry (2-bin paper exit)	SEN SS ENTRY SEN	SRC		0 (Paper empty)
123	Bin (3-bin paper exit)	SEN SS PAPER EXST SEN	SRC		0 (Paper empty)
124	Bin home (lift lower limit)	SEN SS BIN HP SEN	SRC	1 (HP)	
125	Bin rotation	SEN SS BIN ROTA SEN	SR	1 (HP)	
128	Jogger home (shift position)	SEN SS JOGGER HP SEN	SRC	1 (HP)	
129	Grip home	SEN SS CHACK MOVE HP	SR	1 (HP)	
131	Stapler home	SEN SS STPL MOVE HP	SR	1 (HP)	
132	Stapler end	SEN SS STPL END SEN	SR	1 (Stapler end)	
133	Stapler paper	SEN SS PAPER BIND SEN	SRC		0 (Paper empty)
134	Door safety switch	SEN SS DOOR OPEN SEN	SRC	1 (Open)	
135	Encoder	SEN SS ENCORDER SEN	SR		0 (Normal)
136	Inverter	SEN SS REVERS SEN	C		0 (Paper empty)

S : 10 BIN SORTER	R : 20 BIN SORTER	C : 3 BIN SORTER

ARDF

No. for Class 3	Name	Actual Display	Condition	
150	Width small	ADF_SIZE_SMALL	1 (ON)	
151	Width medium	ADF_SIZE_MIDDLE	1 (ON)	
152	Size large	ADF_SIZE_LARGE	1 (ON)	
153	Registration	ADF_REGIST_SEN	1 (Paper present)	
154	Paper exit	ADF_OUT_SEN	1 (Paper present)	
155	Lift-up	ADF_LIFT_SEN	1 (Set)	
156	APS	ADF_APS_SEN		0
157	Paper feed cover	ADF_ICVR_SEN		0 (Open)
158	Paper exit cover	ADF_OCVR_SEN		0 (Open)

4.4.3 SP5-955-018 TEST PATTERN SELECTION

Setting Value	Pattern Name
1	Print margin pattern
2	Print out all fonts
3	1 dot/line grid pattern
4	Belt pattern
5	16-gradation with blank
6	Solid
7	1 dot pattern (2x2)
8	1 dot pattern (4x4)
9	1 dot sub-scan line
10	2 dot sub-scan line
11	1 dot main scan line
12	2 dot main scan line
13	Color patch at trailing edge
14	Grid pattern with scanner image
15	2 dot line grid pattern
16	16-gradation pattern
17	256-gradation pattern

4.4.4 5-955-001 LD_PWM (DOT, LINE)

Defines the LD value for dots and lines on the following test patterns: SP5-955-018: 1-4, 6-15

4.4.5 5-955-002 TO 5-955-016 LD_PWM (16-GRADATION)

Defines the LD values for the 16 –gradations printed on test patterns SP5-955-018: 5, 16.

002: 1/15 (for the second grade)

003: 2/15 (for the third grade)

004: 3/15 (for the fourth grade)

005: 4/15 (for the fifth grade)

006: 5/15 (for the sixth grade)

007: 6/15 (for the seventh grade)

008: 7/15 (for the eighth grade)

009: 8/15 (for the ninth grade)

010: 9/15 (for the tenth grade)

011: 10/15 (for the eleventh grade)

012: 11/15 (for the twelfth grade)

013: 12/15 (for the thirteenth grade)

014: 13/15 (for the fourteenth grade)

015: 14/15 (for the fifteenth grade)

016: 15/16 (for the sixteenth grade)

4.4.6 5-995-017 LD_PWM (COLOR PATCHES)

Defines the LD value for the color patch at the trailing edge of the test pattern (for SP5-955-018: 13)

4.5 USER TOOL

4.5.1 USER TOOL MENU

System settings

Menu	
Panel Tone	——
Ready/Tone	
Copy Count Display	
System Reset	
Function Reset	
Control Panel Off	
Auto Timer	
Tray Paper Size	
Tray Priority	
Auto Tray Switch	
Interleave Print	
Output Tray Prio. (For 3-bin sorter only)	
Display Contrast	
3 Side Full Bleed	
Bypass Custom Size	
Key Operator Tools	Key Op. Access
	Program KeyOpCode
AOF (Keep it on)	——

COPY FEATURES

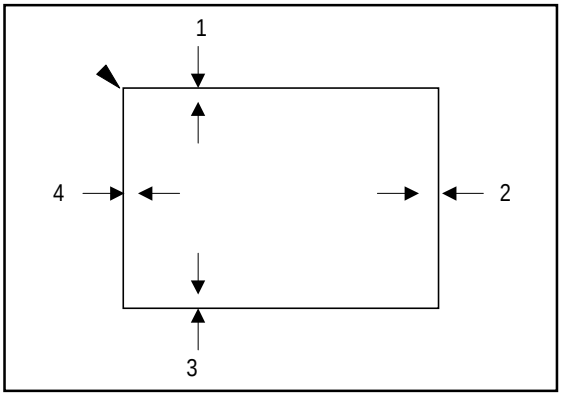
Menu		
General Features	APS Priority	——
	ADS Priority (FC)	
	ADS Prio. (B&K/SC)	
	Orig. Mode Priority	
	Orig. Type Priority	
	Col. Mode Priority	
	Photo Type (Auto)	
	Copy Reset	
	Max. Copy Q'ty	
	Original Tone	
	Margin Adjustment	
	Set User Ratio	
	Initial Mode Set	
	Key Operator Tools	Accessible Modes
		Counter Reset
		Clear Code & Counter
		Program User Code
		Chg/Del User Code
		Counter List Print
Image Adjustment	A.D.S. (FC)	——
	A.D.S. (B&K/SC)	
	A.C.S. Priority	
	Color Sensitivity	
	Auto Color Cal.	
	IJ Printer Select	
ADF/Sorter	SADF Auto Reset	——
	Thin Paper Mode	
	ADF Mixed Sizes	
	ADF Auto Paper Select	
	FC Copy Sorting	
	Auto Sort Mode	
Set Favorite keys	——	——
Special Modes	——	——

4.5.2 SYSTEM SETTINGS

Menu	Description
Panel Tone	The beeper (key tone) sounds when a key is pressed. This beeper can be turned on or off. **Note** ❒ Default: On
Ready/Tone	Choose whether the machine beeps when it becomes ready for a copy run after power up. **Note** ❒ Default: On ❒ When the "Panel Tone" is set to Off, the beeper does not sound even if the "Ready/Tone" is set to On.
Copy Count Display	The copy counter can be set to show the number of copies made (Count Up), or the number of copies remaining to be made (Count Down). **Note** ❒ Default: Count Up
System Reset	The machine returns to its prioritized mode automatically after your job is finished, after the selected time. This function is called "System Reset". The time can be set from 10 to 990 seconds (in 10 seconds steps), or off. 1. Select **[On]** or **[Off]** with the keys. 2. When you select **[On]**, enter the system reset time with the Number keys. Then press the **[OK]** key. **Note** ❒ Default: On (60 seconds)
Function Reset	How long the machine waits before switching to the default mode if no operation has been performed after an operation has finished. The time can be set from 10 to 990 seconds (in 10 seconds steps), or off. 1. Select **[On]** or **[Off]** with the ⇦ ⇨keys. 2. When you select **[On]**, enter the time with the **[Number]** keys. Then press the **[OK]** key. **Note** ❒ Default: On (60 seconds)
Control Panel Off	The machine enters Energy Saver mode automatically after your job is finished, after the selected time. The time can be set from 10 to 990 seconds (in 10 seconds steps), or off. In Energy Saver mode, the panel display turns off. 1. Select **[On]** or **[Off]** with the ⇦ ⇨keys. 2. When you select **[On]**, enter the time with the **[Number]** keys. Then press the **[OK]** key. **Note** ❒ Default: On (60 seconds)
Auto Timer	The machine turns itself off automatically to conserve energy after your job is finished, after the selected time. This function called "Auto Off". The time can be set from 1 to 120 minutes. **Note** ❒ Default: 60 minutes

Menu	Description
Tray Paper Size	Select the size of the copy paper set in the paper tray. Note ❒ If the specified paper size differs from the size of paper actually set in the paper tray, a paper misfeed might occur because the paper size is not detected correctly. **Reference** You can select the paper tray which will be selected as a default in the following conditions: • When the main power switch or operation switch is turned on. • When System Reset or Auto Reset mode is turned on. • When the **[Clear Modes]** key is pressed. • ·When the Auto Paper Select mode is not selected. **Note** ❒ Default: Tray 1 ❒ Tray 2, Tray 3, and Tray 4 are options.
Auto Tray Switch	If you load paper of the same size in two or more trays, the machine auto-matically shifts another tray when the tray in use runs out of paper. You can set or cancel this setting. **Note** ❒ Default: Off
Interleave Print	By default, you can make the interrupt copies. You can cancel this setting. **Note** ❒ Default: On
Output Tray Prio. (For 3-bin sorter only)	You can specify a bin to which documents are delivered for each feature (copy and printer). 1. Select **[Copy]** or **[Printer]** with the ◀ ▶keys. Then press the **[OK]** key. 2. Select a bin with the ◀ ▶ keys. Then press the **[OK]** key. **Note** ❒ Default: Copy: First bin Printer: First bin
Display Contrast	You can adjust the brightness of the panel display. **Note** ❒ Default: level 4

Service Tables

Menu	Description
3 Side Full Bleed	When this mode is off, narrow margins on all 4 sides of the original are not copied.  A259M500.WMF 1: 2±2mm, 0.08"±0.08" 2: 2±2/–1.5mm, 0.08"+0.08"/–0.06" 3: 2±2mm, 0.08"±0.08" 4: 5±2mm, 0.2"±0.08" When you turn it on, margins 1, 2 and 3 are copied. **Note** ❒ Default: Off ❒ You cannot cancel the leading edge margin (margin 4).
Bypass Custom Size	You can register the non-standard size paper when you make copies with the bypass tray. 1. Select **[Custom1]**, **[Custom2]**, or **[Custom3]** with the ⇦ ⇨ keys. 2. Press the **[OK]** key. 3. Enter the vertical size with the **[Number]** keys, then press the **[#]** key. 4. Enter the horizontal size with the **[Number]** keys, then press the **[OK]** key. **Note** ❒ Adjustment value: Metric version: Vertical: 100 - 305mm Horizontal: 140 - 457mm Inch version: Vertical: 3.9" - 12.0" Horizontal: 5.5" - 18.0" ❒ To clear the custom paper size, select the **[Delete]** key.
Key Operator Tools Use these tools to manage use of the machine. **Note** ❒ Enter a previously registered key operator code with the **[Number]** keys.	
Key Op. Access	If you select “On”, only operators who know the key operator code can access the “Key Operator Tools” in the System Settings and Copy Features. **Note** ❒ Default: Off ❒ If you select “On”, you should register the key operator code.

Menu	Description
Program KeyOpCode	Use to register or change the key operator code (up to 8 digits).
AOF	Auto Rower DH mode Disable

4.5.3 COPY FEATURES

General Features

Menu	Description
APS Priority	As a default setting, the Auto Paper Select is selected just after the machine is turned on or when modes are cleared. You can cancel this setting. **Note** ❒ Default: On
ADS Priority (FC)	As a default setting, the Manual Image Density is selected in Full Color mode just after the machine is turned on or when modes are cleared. You can cancel this setting so that the Auto Image Density is selected. **Note** ❒ Default: Off
ADS Prio. (B&K/SC)	As a default setting, the Auto Image Density is selected in Black, Single Color, and Twin Color mode just after the machine is turned on or when modes are cleared. You can cancel this setting. **Note** ❒ Default: On
Orig. Mode Priority	You can select the original image type (Auto Text/Photo mode, Text mode, Photo mode, or Special Original mode) that is selected automatically just after the machine is turned on or when modes are cleared. **Note** ❒ Default: Auto Text/Photo mode
Orig. Type Priority	You can select the special original type (Marker Pen, Inkjet, or Map) that is selected automatically just after the machine is turned on or when modes are cleared. **Note** ❒ Default: Marker Pen
Col. Mode Priority	You can select the color mode (Auto Color Selection mode, Full Color mode, or Black mode) that is selected automatically just after the machine is turned on or when modes are cleared. **Note** ❒ Default: Auto Color Select
Photo Type (Auto)	You can select the photo type (Press Print, Glossy Photo, or 2nd Generation) in Auto Text/Photo mode that is selected automatically just after the machine is tured on or when modes are cleared. **Note** ❒ Default: Press Print
Photo Type (Photo)	You can select the photo type (Press Print, Glossy Photo, or 2nd Generation) in Photo mode that is selected automatically just after the machine is turned on or when modes are cleared. **Note** ❒ Default: Press Print

Menu	Description
Copy Reset	The machine returns to its initial condition automatically after your job is finished. The time can be set from 10 to 300 seconds, or off. 1. Select **[On]** or **[Off]** with the ◀ ▶ keys. 2. When you select **[On]**, enter the time with the **[Number]** keys. Then press the **[OK]** key. **Note** ❒ Default: 60 seconds
Max. Copy Q'ty	The maximum copy quantity can be set from 1 to 99. **Note** ❒ Default: 99
Original Tone	The beeper (key tone) sounds when you forgot to remove originals after copying. **Note** ❒ Default: On ❒ When the "Panel Tone" is set to Off, the beeper does not sound even if the "Original Tone" is set to On.
Margin Adjustment	You can adjust the margin width that is selected as a default in Margin Adjust mode. You can change this setting as follows: 1. Select the margin direction with the ◀▶keys. 2. Enter the margin width with the **[Number]** keys. Then press the **[OK]** key. • Metric version: left/20mm - right/20mm in 1mm steps • Inch version: left/0.8" - right/0.8" in 0.1" steps **Note** ❒ Default: • Metric version: left/10mm • Inch version: left/0.4"
Set User Ratio	Up to 2 reproduction ratios which you frequently use can be registered. 1. Select **[Ratio 1]** or **[Ratio 2]** with the ◀ ▶ keys. 2. Enter your desired ratio with the **[Number]** keys. Then press the **[OK]** key. **Note** ❒ Default: 100 %
Initial Mode Set	You can set the machine to recall program setting when the machine is turned on or when modes are cleared. **Note** ❒ Default: Normal ❒ Your service representative can store the program setting. ❒ Your service representative can select whether the program setting is recalled when the machine is turned on or when modes are cleared.
Key Operator Tools Use these tools to manage use of the machine. **Note** ❒ Enter a previously registered key operator code with the **[Number]** keys.	

Menu	Description
Accessible Modes	You can assign user codes to each color mode. Operators must input their user codes before using each color mode (Full Color, Black, Single Color, and Twin Color). The machine keeps count of the number of copies made under each user code. 1. Select your desired color mode with the ◀ ▶ keys. 2. Press the **[Select]** key. 3. Press the **[Exit]** key. **Note** ❒ Repeat steps 1 and 2 until you finished designating color modes.
Counter Reset	You can check the number of copies made using each user code. Also, you can clear each code's counter. 1. Input user code you want to check its number of copies with the **[Number]** keys. 2. Press the **[OK]** key. **Note** ❒ You can check the number of copies. ❒ To clear the counter, press the **[Reset]** key. Then press the **[Yes]** key. 3. Press the **[Exit]** key.
Clear Code & Counter	You can reset the counter for all user codes and delete all user codes. 1. Select **[User Code]** to delete all user codes or **[Counter]** to reset the counter for all user codes with the keys. 2. Press the **[Yes]** key. 3. Press the **[Exit]** key.

Image Adjustment

Menu	Description
A.D.S. (FC)	You can register your user code (8 digits). 1. Input your desired user code with the **[Number]** keys. 2. Press the **[OK]** key. 3. Select the color mode you want to use with the new code with the keys. 4. Press the **[Select]** key. 5. Press the **[Exit]** key. **Note** ❒ Repeat steps 3 and 4 until you finished designating color modes. ❒ Up to 50 user codes can be registered.
	You can change or delete your user code or the color mode you assign your user code. **Changing your user code** 1. Input user code you want to change with the Number keys. Then press the **[#]** key. 2. Press the **[Change]** key. 3. Input new user code with the **[Number]** keys. 4. Press the **[OK]** key. 5. Select the color mode you want to use with the new code with the keys. 6. Press the **[Select]** key. 7. Press the **[Exit]** key. **Note** ❒ Repeat steps 5 and 6 until you finished designating color modes. **Deleting your user code** 1. Input user code you want to delete with the **[Number]** keys. Then press the **[#]** key. 2. Press the **[Delete]** key. 3. Press the **[Yes]** key. **Note** ❒ The number of copies made under the deleted code is also deleted.
Counter List Print	You can print data for all user codes.
A.D.S. (FC)	The Auto Image Density levels in Full Color mode can be made lighter or darker (5 levels). **Note** ❒ Default: level 3
A.D.S. (B&K/SC)	The Auto Image Density levels in Black mode, Single Color mode, or Twin Color mode can be made lighter or darker (5 levels). **Note** ❒ Default: level 3

Menu	Description
A.C.S. Priority	You can select color images or black & white images that are priority detected in Auto Color Selection mode. **Note** ❒ Default: Full Color
Color Sensitivity	When in Color Erase or Color Conversion mode, the function can be made more or less sensitive to the color to be erased or converted. It can be adjusted within 5 levels (“Narrow” to “Wide”). For example, if red is selected as the color to be erased or converted, “Narrow” will result in only red being erased or converted, and “Wide” will result in other colors close to red being erased or converted. **Note** ❒ Default: level 3
Auto Color Cal.	When the tone of a specific color is strong or the color tone of copies is different from that of originals, perform this function. This function adjusts the balance of the 4 basic colors. 1. If your machine has the printer option installed, select **[Copy Mode]** or **[Printer Mode]** with the ◀ ▶ keys. Then press the **[OK]** key. 2. Make sure that A4 ▯, 81/2" x 11" ▯ , B4 ▭, A3 ▭, or 11" x 17" ▭ is set in trays. Then press the **[Print]** key. **Note** ❒ The test pattern is delivered to the copy tray. 1. Set the test pattern on the exposure glass (platen glass). Then press the **[Scan]** key. **Limitation** ❒ You cannot set the test pattern in the document feeder. **Note** ❒ To return to the previous setting, repeat steps 1 to 3 and press the [Previous] key.
IJ Printer Select	You can select the type of inkjet printer if your originals are printed with inkjet printer. **Note** ❒ Default: 1
SADF Auto Reset	When you set one original at a time in the document feeder, the Auto Feed indicator lights for a selected time after an original is fed to show that the document feeder is ready for another original. The time can be set from 1 second to 99 seconds. **Note** ❒ Default: 5 seconds
Thin Paper Mode	Use when changing the type of originals to be fed. Select this function to avoid damaging thin originals (40 - 52g/m^2, 11-14 lb) set in the document feeder. **Note** ❒ Default: Off

Menu	Description
ADF Mixed Sizes	By default, you cannot set originals of different sizes at one time in the document feeder. You can cancel this setting. **Note** ❒ Default: Off ❒ If you select **[On]**, the copying speed will be reduced. ❒ When setting different length originals, all originals must be flush with the back fence of the document feeder. ❒ Smaller size originals might be skewed a little.
ADF Auto Paper Select	By default, the Auto Paper Select is selected when you set originals in the document feeder. You can cancel this setting. **Note** ❒ Default: On
FC Copy Sorting	You can disable sorting, stacking, or stapling in Full Color mode to maximize quality of full color copies. **Note** ❒ Default: Available (Sorting, stacking, or stapling can be used in Full Color mode.)
Auto Sort Mode	You can have the machine select Sort mode automatically when you insert two or more originals in the document feeder and make two or more copies from each original. **Note** ❒ Default: On

Set Favorite Keys

You can register up to 4 frequently used functions in **[Favorite]** keys.

1. Press the **[Favorite]** key you want to store the function.
2. Select the function you want to store with the ◀ ▶ keys.
3. Press the **[OK]** key.

Note

❒ Default:
   1) Combine 2 Originals
   2) Series Copies
   3) Margin Adjustment
   4) Directional Size Magnification (mm)

❒ You can check the functions that are registered in the **[Favorite]** keys with the **[Status]** key.

Special Modes

Use to recall the special modes set by your service representative.

Note

❒ Default: Off

❒ The special modes are set by your service representative. If you want to use this function, contact your service representative.

4.6 TP/SW/LED/FUSE

4.6.1 MAIN CONTROL BOARD TEST POINTS

TP No.	Signal	Description	Stand-by (V)	Remarks	TP Implementation
TP101	GND	Ground	0 to 5.0		Yes
TP102	GND	Ground	0 to 5.0		Yes
TP103	X-	TP X-axis ground terminal	0 to 5.0		Yes
TP104	X+	TP X-axis power terminal	0 to 5.0	In the press sense mode, held at the VCC level when released and lowered to 3V or lower when pressed.	Yes
TP105	Y-	TP Y-axis ground terminal	0 to 5.0		Yes
TP106	Y+	TP Y-axis power terminal	0 to 5.0		Yes
TP109	XCK	LCD data shift lock	0 to 5.0	Data is shifted into the X driver on the falling edge of this clock.	Yes
TP110	LP	LCD latch pulse output terminal	0 to 5.0	Data is latched into the driver's shift register to turn on the Y driver for that line on the falling edge of this signal.	Yes
TP111	YD	LCD Y driver frame start signal	0 to 5.0		Yes
TP124	/DME	Identifies the end of IPU image transfer during area processing.	0 to 5.0	Hardware-asserted at the end of transfer and disasserted when the register is written under software control. Active L	Yes
TP130	GND	Ground	0		Yes
TP131	/RESET	Open-drain bi-directional signal that serves as the external device reset output from the CPU and as the hardware reset input from the reset IC.	0 to 5.0	Active L	Yes
TP134	/FGATE	Input terminal for /BFGATE interrupts from the write control board	0 to 5.0	Active L	Yes
TP137	BLTPTN	Transfer belt mark input signal	0 to 5.0	Active H	Yes
TP138	/DSACK1	Hand-shake signal for 16-bit devices	0 to 5.0	Indicates that the CPU is ready for completing the bus cycle. Active L	Yes
TP141	/DSACK0	Hand-shake signal for 8-bit devices	0 to 5.0	Indicates that the CPU is ready for completing the bus cycle. Active L	Yes
TP143	GND	Ground	0		Yes
TP148	CLK	System clock output to external devices	0 to 5.0	Set to 19.6608 MHz when the CPU is started.	Yes
TP153	/AS	Asserted while a valid address is present on the address bus.	0 to 5.0	Active L	Yes

TP No.	Signal	Description	Stand-by (V)	Remarks	TP Implementation
TP154	UPHT_TH	Analog input from the fusing thermistor (upper)	0 to 5.0		Yes
TP155	/IACK	Used to get an interrupt vector.	0 to 5.0	Active L	Yes
TP156	LWHT_TH	Analog input from the fusing thermistor (lower)	0 to 5.0		Yes
TP157	FB_T2	Feedback sense terminal for the secondary transfer bias	0 to 5.0		Yes
TP158	FB_T1	Feedback sense terminal for the primary transfer bias	0 to 5.0		Yes
TP160	FB_G	Feedback sense terminal for the grid bias	0 to 5.0		Yes
TP162	FB_C	Feedback sense terminal for the charge corona unit bias	0 to 5.0		Yes
TP167	FB_BDC	Feed back sense terminal for the development bias (DC)	0 to 5.0		Yes
TP168	HUM	Humidity sensor analog input	0 to 5.0		Yes
TP170	/Z_CROSS	Zero-cross interrupt input	0 to 5.0	Active L	Yes
TP172	TMP	Temperature sensor analog input	0 to 5.0		Yes
TP173	P_SEN2	Density sensor color output	0 to 5.0		Yes
TP174	P_SEN1	Density sensor black output	0 to 5.0		Yes
TP176	V_SEN	Potential sensor analog input	0 to 5.0		Yes
TP178	ENGY	Enable signal for transition to the Energy Star mode	0 to 5.0	Active H	Yes
TP182	ANGND	Analog ground	0		Yes
TP185	GND	Ground	0		Yes
TP186	+5V	+5V	5.0		Yes
TP187	GND	Ground	0		Yes

4.6.2 SCANNER IPU BOARD TEST POINTS

TP No.	Signal	Description	Stand-by(V)	Remarks	TP Implementation
TP01	GND	Ground	0		Yes
TP02	IFGATEL	Frame gate signal	0 to 3.3	Active L	No
TP03	GND	Ground	0		Yes
TP04	ILSYNCL	Line Sync. signal	0 to 3.3	Active L	No
TP07	GND	Ground	0		Yes
TP09	AGND	Analog ground	0		No
TP10	AGND	Analog ground	0		No
TP13	AGND	Analog ground	0		No
TP14	+5VA	Analog +5V power source	5.0		No
TP15	AGND	Analog ground	0		No
TP17	+12VA	Analog +12V power source	12.0		No
TP20	Vpeak	Samples and holds the image's background level.	3.0 to 4.0		No
TP21	+5V	5V power source	5.0		No
TP22	GND	Ground	0		Yes
TP23	GND	Ground	0		Yes

4.6.3 LD MAIN CONTROL BOARD TEST POINTS

TP No.	Signal	Description	Stand-by(V)	Remarks	TP Implementation
TP601	GND	Ground	0		No
TP602	LDON	Shortening this terminal to ground causes the LD to stay on in full mode during the polygon ON period.	0 to 5.0	Active L	No
TP603	XWD7	Least significant bit of the LD control image data (1/8 bits)	5	Active L	No
TP604	LDCLK	LD control pixel clock used to latch data.	5	Active H	No
TP605	LDLVL	Defines the LD control reference voltage. 0 to 2V, normally 1V.	0 to 2.0	Normally held at 1V. Active H	No
TP606	BTRIG	Belt mark signal. Set when a transfer belt mark is sensed.	0 to 5.0	Set high when a transfer belt mark is sensed.	No
TP607	XPM	PMSYNC. Line sync. signal.	0 to 5.0	Approx. 407.05 µs. Active L	No
TP608	XWFG	WFGATE. Externally referenced frame sync. signal. Controlled by the scanner in the copy mode and by the controller in the print mode.	0 to 5.0	Under control of the scanner in the copy mode and of the controller in the print mode. Active L	No
TP609	XBFG	BFGATE. Write frame sync. signal. Set by a belt mark or software trigger. Source signal for XSFG.	0 to 5.0	Triggered by a belt mark or software trigger. Source signal for XSFG. Active L	No
TP610	GND	Ground	0		No
TP611	XSLS	SLSYNC. Scanner or controller line sync•signal.	0 to 5.0	Active L	No
TP612	XSFG	SFGATE. Scanner or controller frame sync. signal.	0 to 5.0	Active L	No

4.6.4 I/O CONTROL BOARD TEST POINTS

TP No.	Signal	Description	Stand-by(V)	Remarks	TP Implementation
TP201	RP_SEN2	Paper height sensor signal 1 (right)	0 to 5.0	Shade "H"	No
TP202	RP_SEN1	Paper height sensor signal 2 (left)	0 to 5.0	Shade "H"	No
TP203	T2_SEN	Secondary transfer unit contact/release sensor signal	0 to 5.0	Contact "H"	No
TP204	XFEED_PE	Paper tray (single side) paper end sensor signal	0 to 5.0	Paper end "L"	No
TP205	XMID_SEN	Middle sensor signal	0 to 5.0	Detect a paper "L"	No
TP206	FUD_SEN	Paper tray lift sensor signal	0 to 5.0	Upper position "H"	No
TP207	IMP_CLK	Drum motor speed control clock	0 to 5.0		No
TP208	PWM_T2	Secondary transfer high-voltage output control signal	0 to 5.0		No
TP209	PWM_T1	Primary transfer high-voltage output control signal	0 to 5.0		No
TP210	BLTPTN	Belt mark sensor signal	0 to 5.0	Mark sensed = "H"	No
TP211	XREV_HP	Revolver HP sensor signal	0 to 5.0	Home position = "H"	No
TP212	XRGT_SEN	Registration sensor signal	0 to 5.0	Paper present = "L"	No
TP213	AGND	Power ground	0		Yes
TP214	RM_A	Revolver phase excitation signal	0 to 5.0	4 1/phase excitation signals	No
TP215	FEED_CLK	Paper feed motor speed control clock	0 to 5.0		No
TP216	XIORST	I/O expander reset signal	0 to 5.0	Reset = "L"	No
TP217	IOCLK	Address/data bus clock	0 to 5.0		No
TP218	XST	Address/data bus start signal	0 to 5.0		No
TP219	DIR	Data bus direction control signal	0 to 5.0		No
TP220	FB_T2	Secondary transfer high-voltage feedback voltage	0 to 5.0		No
TP221	FB_T1	Primary transfer high-voltage output control signal	0 to 5.0		No
TP222	HUM_SEN	Humidity sensor output	0 to 5.0		No
TP223	TMP_SEN	Temperature sensor output	0 to 5.0		No
TP224	FB_C	Charge corona output feedback voltage	0 to 5.0		No
TP225	V_SEN	Potential sensor output	0 to 5.0		No
TP226	FB_G	Grid output feedback voltage	0 to 5.0		No
TP227	P_SEN1	Black density output	0 to 5.0		No
TP228	FB_BDC	Development bias feedback voltage	0 to 5.0		No
TP229	P_SEN2	Color (cyan, magenta, yellow) density output	0 to 5.0		No
TP230	LWHT_TH	Pressure roller thermistor output	0 to 5.0		No
TP231	UPHT_TH	Hot roller thermistor output	0 to 5.0		No
TP232	CGNDA	Analog signal ground	0		Yes
TP233	CGND	Digital signal ground	0		Yes
TP234	PWM_BDC	Development bias voltage control signal	0 to 5.0		No
TP235	FUS_CLK	Fusing motor speed control signal	0 to 5.0		No

TP No.	Signal	Description	Stand-by(V)	Remarks	TP Implementation
TP236	PWM_C	Charge corona current control signal	0 to 5.0		No
TP237	PWM_G	Grid voltage control signal	0 to 5.0		No
TP239	VCC2A	Analog +5V power source	5.0		Yes
TP240	VCC2	Digital +5V power source	5.0		Yes
TP241	AGND	Power ground	0		Yes
TP242	VAA2	+24V power source	24.0		Yes
TP243	VCA	+12V power source	12.0		Yes
TP244	VCB	-12V power source	-12.0		Yes
TP245	CGNDA	Analog signal ground	0		Yes
TP247	CGND	Digital signal ground	0		Yes
TP248	XEXIT_SEN	Paper exit sensor signal	0 to 5.0	Paper present = "L"	No
TP249	XFUS_FAN	Fusing fan ON/OFF signal	0 to 24.0	ON = "L"	No
TP250	XZ_CROSS	Zero-cross signal	0 to 5.0	Zero-cross section = "L"	No
TP251	ENGY_ON	Energy Star sleep signal ON/OFF signal	0 to 5.0	Sleep mode = "H"	No
TP252	PLED	ID sensor LED luminous quantity control voltage	0 to 5.0		No
TP254	BC_SEN	Belt cleaning blade contact/release sensor	0 to 5.0	Contact = "H"	No
TP256	XDEV_CL	Development clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP257	XDUP_SOL	Duplex solenoid o ON/OFF signal	0 to 24.0	ON = "L"	No
TP258	XT_CNT2	Total counter 2 count signal	0 to 24.0	1 count = 1 L pulse	No
TP259	XKCOUNT	Key counter count signal	0 to 24.0	1 count = 1 L pulse	No
TP260	XBPF_CL	By-pass paper feed clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP263	XCH_FAN	Charge corona fan ON/OFF signal	0 to 24.0	ON = "L"	No
TP264	XQL	QL ON/OFF signal	0 to 24.0	ON = "L"	No
TP265	XT_CNT1	Total counter 1 count signal	0 to 24.0	1 count = 1 L pulse	No
TP266	XT_MTR	Toner supply motor ON/OFF signal	0 to 24.0	ON = "L"	No
TP267	XRA_PRT	Fusing/pressure roller lamp power relay ON/OFF signal	0 to 24.0	ON = "L"	No
TP268	XTRG_D	Separation charge corona unit output ON/OFF signal	0 to 24.0	ON = "L"	No
TP269	RM_I08A	Revolver motor current 0.8 A drive signal	0 to 5.0	0.8 A = "H"	No
TP270	RM_I15A	Revolver motor current 1.5 A drive signal	0 to 5.0	1.5 A = "H"	No
TP271	XIMP_TRG	Drum motor ON/OFF signal	0 to 5.0	ON = "L"	No
TP272	XTRG_PCC	PCC output ON/OFF signal	0 to 24.0	ON = "L"	No
TP273	XTRG_BAC	Development bias AC component ON/OFF signal	0 to 24.0	ON = "L"	No
TP274	FUMTR-	Tray lift motor down signal	0 to 24.0	Down = "H"	No
TP275	XTRP_FAN	Transport fan ON/OFF signal	0 to 24.0	ON = "L"	No
TP278	XRGT_CL	Registration clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP279	XMID_CL	Relay clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP280	XEXU_FAN	Exhaust fan ON/OFF signal	0 to 24.0	ON = "L"	No
TP281	FUMTR+	Tray lift motor up signal	0 to 24.0	Upper Position "H"	No
TP282	XSWP_CL	Sweeper clutch ON/OFF signal	0 to 24.0	ON = "L"	No

TP No.	Signal	Description	Stand-by(V)	Remarks	TP Implementation
TP283	XFUS_CL	Fusing clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP284	XBC_CL	Belt cleaning clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP285	XFEED_CL	Paper feed clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP286	XT2_CL	Secondary transfer contact/release clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP287	XIMP_CW	Drum motor forward/backward control signal	0 to 5.0	Forward = "L"	No
TP288	XFEED_TRG	Paper feed motor ON/OFF signal	0 to 5.0	ON = "L"	No
TP289	XFUS_TRG	Fusing motor ON/OFF signal	0 to 5.0	ON = "L"	No
TP290	XFDOPEN	Front door open sensor signal	0 to 5.0	Open = "L"	No
TP291	XFEEDOPEN	Vertical transport door open sensor signal	0 to 5.0	Open = "L"	No
TP292	XEXITOPEN	Paper exit door open sensor signal	0 to 5.0	Open = "L"	No
TP293	XLEAK_D	Separation charge corona unit leak sensor signal	0 to 5.0	Leak = "L"	No
TP294	XLEAK_PCC	PCC leak sensor signal	0 to 5.0	Leak = "L"	No
TP295	XIMP_LOCK	Drum motor lock state sensor signal	0 to 5.0	Lock = "L"	No
TP296	XBPFSIZE0	By-pass paper width sensor signal (bit 0)	0 to 5.0		No
TP297	XFEED_LOCK	Paper feed motor lock state sensor signal	0 to 5.0	Lock = "L"	No
TP301	XBPFSIZE3	By-pass paper width sensor signal (bit 3)	0 to 5.0		No
TP302	XBPFSIZE2	By-pass paper width sensor signal (bit 2)	0 to 5.0		No
TP303	XBPFSIZE1	By-pass paper width sensor signal (bit 1)	0 to 5.0		No
TP306	XOILEND	Oil end sensor signal	0 to 5.0	Oil end = "L"	No
TP308	XFUS_LOCK	Fusing motor lock state sensor signal	0 to 5.0	Lock = "L"	No
TP309	XRA_SCN	Lamp regulator power relay	0 to 24.0	ON = "L"	No
TP310	XLWHT_TRG	Pressure roller lamp ON/OFF signal	0 to 24.0	ON = "L"	No
TP311	XUPHT_TRG	Fusing lamp ON/OFF signal	0 to 24.0	ON = "L"	No
TP312	XBPF_SOL	By-pass clutch ON/OFF signal	0 to 24.0	ON = "L"	No
TP313	XEXU_FAN2	Exhaust fan 2 ON/OFF signal	0 to 24.0	ON = "L"	No

4.6.5 SWITCH SPECIFICATIONS

Scanner IPU Board

No.	Description	Remarks
SW2		
SW2-1	1 scan	
SW2-2	Motor excitation off	
SW2-3	Lamp on	
SW2-4	Free-running	
SW2--5	IPU input select	ON: External image input OFF: Scanner image input
SW2--6	Not used.	

4.6.6 LED SPECIFICATIONS

No.	Function Outline	Remarks
Main control board		
LED105	Flashes if the board is starting.	
SCN_IPU board		
LED1	First NG due to black level O/E difference correction error	Turns on and off repeatedly at 400 ms intervals.
	Second NG due to black level O/E difference correction error	Turns on and off repeatedly at 1.6 s intervals.
LED2	First NG due to black level correction error	Turns on and off repeatedly at 400 ms intervals.
	Second NG due to black level correction error	Turns on and off repeatedly at 1.6 s intervals.
LED3	NG due to white level correction error	Turns on and off repeatedly at 400 ms intervals.
LED4	Flashes while the CPU is running.	
LED5	Flashes while image signal is being sent to the LD unit.	
LED6	Flashes while FGATE is active (scanning).	

4.6.7 FUSE SPECIFICATIONS

PSU (US model)

FUSE No.	Rating	Use	Replaceable	Vendor Name	Model No.	R Parts No.
FU101	15A 125/250Vac	AC input main fuse	Yes	SOC CORP or LITTELFUSE INC	CES6-15AN1 or 314015	11070629
FU102	8A 125/250Vac	PSU AC input fuse	Yes	SOC CORP or LITTELFUSE INC	ULTSC-8AN1 or 237008(MB000)	11070393
FU103	3.15A 125Vac	AC output dehumidification heater fuse	No	WICKMANN-WERKE GMBH	K19396/3.15A or K19374/3.15A	(11070724)
FU1	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	ULTSC-4AN1 or 237004(MB000)	11070390
FU2	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	ULTSC-4AN1 or 237004(MB000)	11070390
FU3	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	ULTSC-4AN1 or 237004(MB000)	11070390
FU4	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	ULTSC-4AN1 or 237004(MB000)	11070390
FU31	3.15A 125Vac	+5V safety regulation compliant protective fuse	No	WICKMANN-WERKE GMBH	K19396/3.15A or K19374/3.15A	(11070724)
FU71	2A 125Vac	-12V safety regulation compliant protective fuse	No	WICKMANN-WERKE GMBH	K19374/2A or K19396/2A	(11070713)
FU81	3.15A 125Vac	+12/+15V safety regulation compliant fuse	No	WICKMANN-WERKE GMBH	K19396/3.15A or K19374/3.15A	(11070724)
FU83	2A 125/250Vac	Vcd(+15V) output fuse	Yes	SOC CORP or LITTELFUSE INC	ULTSC-2AN1 or 237002(MB000)	11070388

When one of the fuses below blows, the machine indicates the following conditions:

- FU101: The machine does not work. The PSU does not supply any power to the electrical components.
- FU102: The machine does not work. The PSU supplies power only to the anti-condensation heaters.
- FU1, FU2: The machine displays that the front door is opened.
- FU3: The machine displays SC101 (Exposure Lamp Error).
- FU4: One of the peripheral devices will not run (a paper jam or paper empty condition is displayed).
- FU83: The machine displays SC171 (Black Level Correction Error).

PSU (European/Asian Model)

FUSE No.	Rating	Use	Replaceable	Vendor Name	Model No.	R Parts No.
FU102	5A 125/250Vac	PSU AC input fuse	Yes	LITTELFUSE INC or BUSSMANN	215005 or A505-5A	11070879
FU103	2A 125Vac/ 250V	AC output dehumidification heater fuse	No	WICKMANN-WERKE GMBH	K19372/2A	(11070621)
FU1	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	UL-ET-4A or 218004 (MB000)	11070921
FU2	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	UL-ET-4A or 218004 (MB000)	11070921
FU3	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	UL-ET-4A or 218004 (MB000)	11070921
FU4	4A 125/250Vac	Vaa(+24) output fuse	Yes	SOC CORP or LITTELFUSE INC	UL-ET-4A or 218004 (MB000)	11070921
FU31	2A 125Vac/ 250V	+5V safety regulation compliant protective fuse	No	WICKMANN-WERKE GMBH	K19370/2A	(11070658)
FU71	2A 125Vac/ 250V	-12V safety regulation compliant protective fuse	No	WICKMANN-WERKE GMBH	K19372/2A	(11070621)
FU81	3.15A 125Vac/ 250V	+12/+15V safety regulation compliant fuse	No	WICKMANN-WERKE GMBH	K19372/3.15A	(11070622)
FU83	2A 125/250Vac	Vcd(+15V) output fuse	Yes	SOC CORP or LITTELFUSE INC	UL-ET-2A or 218002 (MB000)	11070936

When one of the fuses below blows, the machine indicates the following conditions:

- FU102: The machine does not work. The PSU supplies power only to the anti-condensation heaters.
- FU1, FU2: The machine displays that the front door is opened.
- FU3: The machine displays SC101 (Exposure Lamp Error).
- FU4: One of the peripheral devices will not run (a paper jam or paper empty condition is displayed).
- FU83: The machine displays SC171 (Black Level Correction Error).

5. PREVENTIVE MAINTENANCE

5.1 PM PROCEDURES

5.1.1 PM-RELATED COUNTERS

The major PM related counters available in the SP modes are summarized below. After performing a PM procedure, clear the PM counters.

SP7-803 (Show PM Counter)

SP7-803-001: Counter for preventive maintenance

SP7-804 (Clear PM Counter)

SP7-804-001: Counters for 60 kD preventive maintenance parts
SP7-804-002: Counters for 120 kD preventive maintenance parts
SP7-804-003: Clears 7-803-001

SP7-202 (Show Development Counters)

Shows the number of times each color has been developed.

SP7-202-001: Total

SP7-202-002: Black

SP7-202-003: Cyan

SP7-202-004: Magenta

SP7-202-005: Yellow

SP7-818 (Clear Development Counters)

Clears the development counters indicated in SP7-202.

SP7-818-001: Black

SP7-818-002: Cyan

SP7-818-003: Magenta

SP7-818-004: Yellow

SP7-203 (Show Image Production Counters)

Shows the usage of major components by number of images produced.

SP7-207 (Show Cleaning Counters)

Shows the number of uses of the cleaning-related parts.

SP7-210 (Show Fusing Counters)

Shows the number of uses of the fusing related parts

SP 7-910 (paper separation corona counters)

Shows the number of uses of the separation corona

SP 7-911 (duplex tray counters)

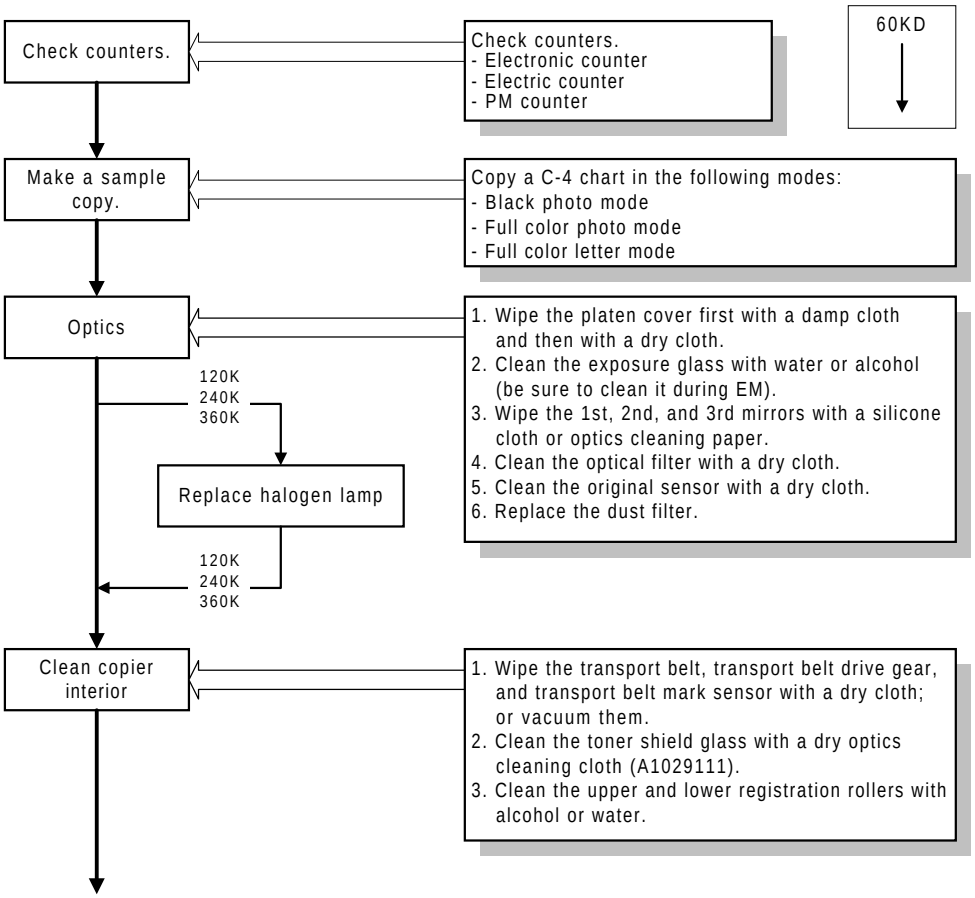
Shows the number of uses of the duplex tray related parts

SP 7-912 (exposure lamp counter)

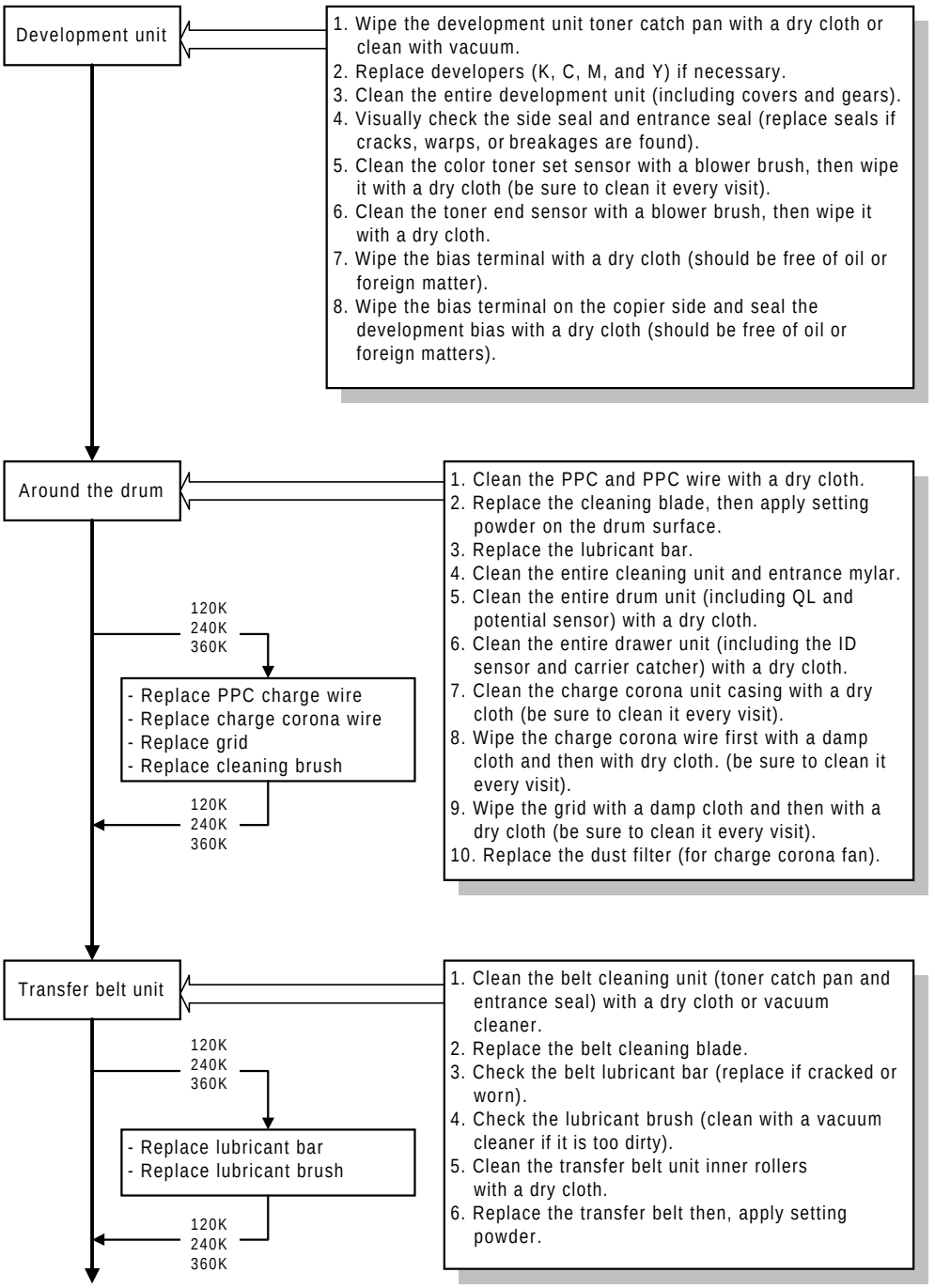
Shows the number of uses of the exposure lamp

5.1.2 REGULAR PREVENTIVE MAINTENANCE FLOW DIAGRAM

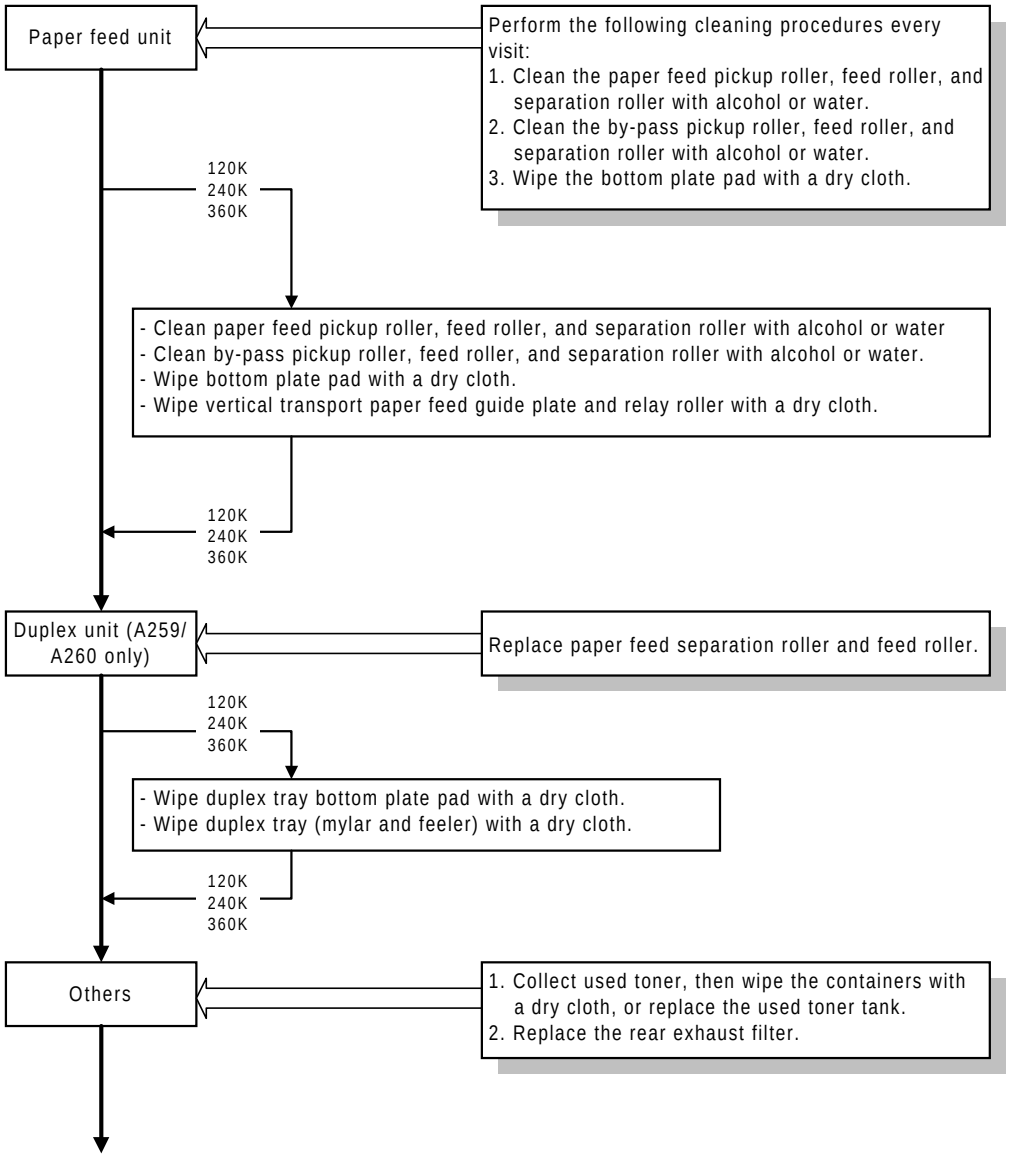
NOTE: To replace the developer and the drum, the procedure to use depends on the combination of developers and drum to be replaced (See 6-6 Development Unit)


Check counters.
Check counters.
- Electronic counter
- Electric counter
- PM counter
60KD
Make a sample copy.
Copy a C-4 chart in the following modes:
- Black photo mode
- Full color photo mode
- Full color letter mode
Optics
1. Wipe the platen cover first with a damp cloth and then with a dry cloth.
2. Clean the exposure glass with water or alcohol (be sure to clean it during EM).
3. Wipe the 1st, 2nd, and 3rd mirrors with a silicone cloth or optics cleaning paper.
4. Clean the optical filter with a dry cloth.
5. Clean the original sensor with a dry cloth.
6. Replace the dust filter.
120K
240K
360K
Replace halogen lamp
120K
240K
360K
Clean copier interior
1. Wipe the transport belt, transport belt drive gear, and transport belt mark sensor with a dry cloth; or vacuum them.
2. Clean the toner shield glass with a dry optics cleaning cloth (A1029111).
3. Clean the upper and lower registration rollers with alcohol or water.

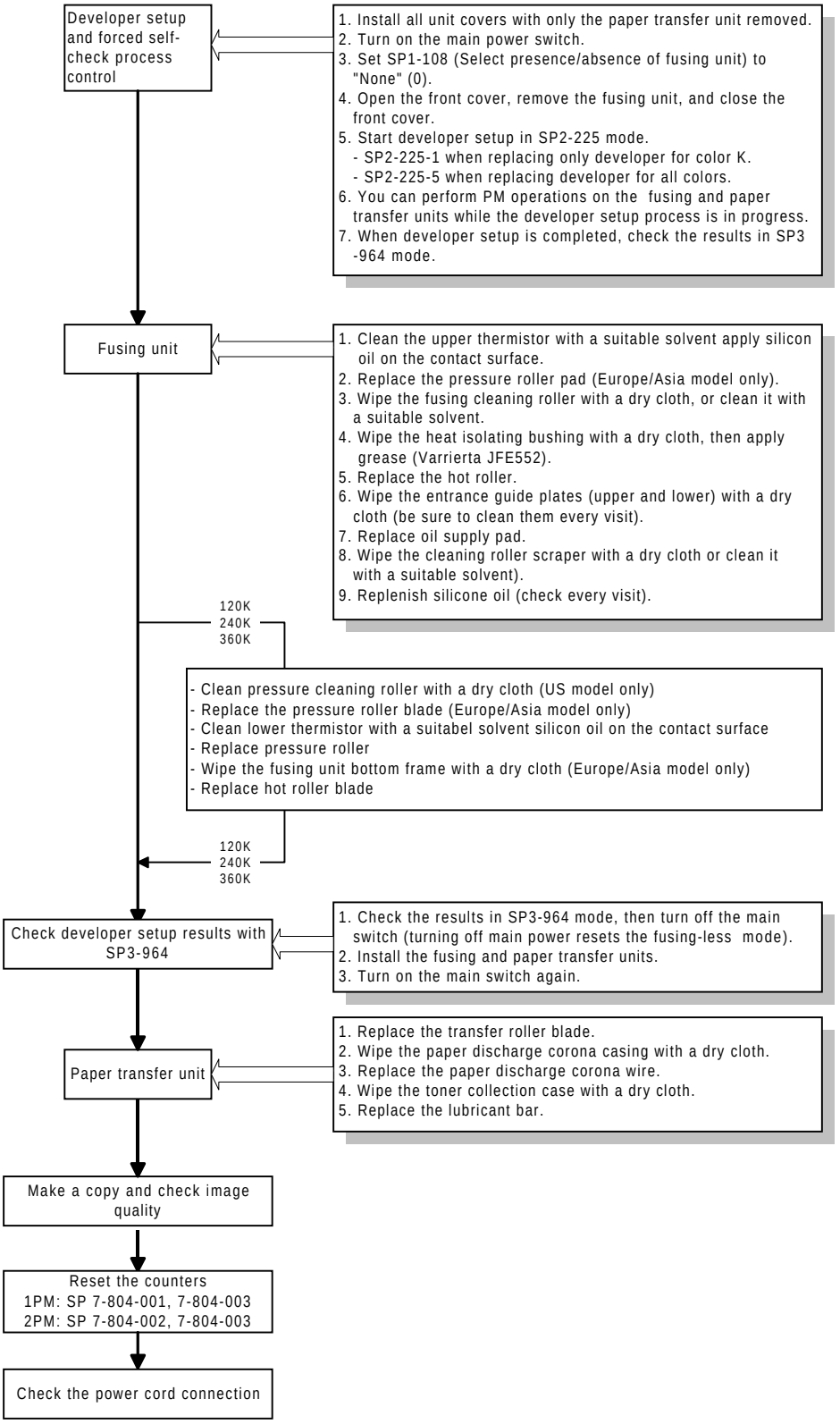
A259P500.WMF


Development unit
1. Wipe the development unit toner catch pan with a dry cloth or clean with vacuum.
2. Replace developers (K, C, M, and Y) if necessary.
3. Clean the entire development unit (including covers and gears).
4. Visually check the side seal and entrance seal (replace seals if cracks, warps, or breakages are found).
5. Clean the color toner set sensor with a blower brush, then wipe it with a dry cloth (be sure to clean it every visit).
6. Clean the toner end sensor with a blower brush, then wipe it with a dry cloth.
7. Wipe the bias terminal with a dry cloth (should be free of oil or foreign matter).
8. Wipe the bias terminal on the copier side and seal the development bias with a dry cloth (should be free of oil or foreign matters).
Around the drum
1. Clean the PPC and PPC wire with a dry cloth.
2. Replace the cleaning blade, then apply setting powder on the drum surface.
3. Replace the lubricant bar.
4. Clean the entire cleaning unit and entrance mylar.
5. Clean the entire drum unit (including QL and potential sensor) with a dry cloth.
6. Clean the entire drawer unit (including the ID sensor and carrier catcher) with a dry cloth.
7. Clean the charge corona unit casing with a dry cloth (be sure to clean it every visit).
8. Wipe the charge corona wire first with a damp cloth and then with dry cloth. (be sure to clean it every visit).
9. Wipe the grid with a damp cloth and then with a dry cloth (be sure to clean it every visit).
10. Replace the dust filter (for charge corona fan).
120K
240K
360K
- Replace PPC charge wire
- Replace charge corona wire
- Replace grid
- Replace cleaning brush
120K
240K
360K
Transfer belt unit
1. Clean the belt cleaning unit (toner catch pan and entrance seal) with a dry cloth or vacuum cleaner.
2. Replace the belt cleaning blade.
3. Check the belt lubricant bar (replace if cracked or worn).
4. Check the lubricant brush (clean with a vacuum cleaner if it is too dirty).
5. Clean the transfer belt unit inner rollers with a dry cloth.
6. Replace the transfer belt then, apply setting powder.
120K
240K
360K
- Replace lubricant bar
- Replace lubricant brush
120K
240K
360K

A259P501.WMF


Paper feed unit
Perform the following cleaning procedures every visit:
1. Clean the paper feed pickup roller, feed roller, and separation roller with alcohol or water.
2. Clean the by-pass pickup roller, feed roller, and separation roller with alcohol or water.
3. Wipe the bottom plate pad with a dry cloth.
120K
240K
360K
- Clean paper feed pickup roller, feed roller, and separation roller with alcohol or water
- Clean by-pass pickup roller, feed roller, and separation roller with alcohol or water.
- Wipe bottom plate pad with a dry cloth.
- Wipe vertical transport paper feed guide plate and relay roller with a dry cloth.
120K
240K
360K
Duplex unit (A259/ A260 only)
Replace paper feed separation roller and feed roller.
120K
240K
360K
- Wipe duplex tray bottom plate pad with a dry cloth.
- Wipe duplex tray (mylar and feeler) with a dry cloth.
120K
240K
360K
Others
1. Collect used toner, then wipe the containers with a dry cloth, or replace the used toner tank.
2. Replace the rear exhaust filter.

A259P502.WMF


Developer setup and forced self-check process control
1. Install all unit covers with only the paper transfer unit removed.
2. Turn on the main power switch.
3. Set SP1-108 (Select presence/absence of fusing unit) to "None" (0).
4. Open the front cover, remove the fusing unit, and close the front cover.
5. Start developer setup in SP2-225 mode.
- SP2-225-1 when replacing only developer for color K.
- SP2-225-5 when replacing developer for all colors.
6. You can perform PM operations on the fusing and paper transfer units while the developer setup process is in progress.
7. When developer setup is completed, check the results in SP3-964 mode.
Fusing unit
1. Clean the upper thermistor with a suitable solvent apply silicon oil on the contact surface.
2. Replace the pressure roller pad (Europe/Asia model only).
3. Wipe the fusing cleaning roller with a dry cloth, or clean it with a suitable solvent.
4. Wipe the heat isolating bushing with a dry cloth, then apply grease (Varrierta JFE552).
5. Replace the hot roller.
6. Wipe the entrance guide plates (upper and lower) with a dry cloth (be sure to clean them every visit).
7. Replace oil supply pad.
8. Wipe the cleaning roller scraper with a dry cloth or clean it with a suitable solvent).
9. Replenish silicone oil (check every visit).
120K
240K
360K
- Clean pressure cleaning roller with a dry cloth (US model only)
- Replace the pressure roller blade (Europe/Asia model only)
- Clean lower thermistor with a suitabel solvent silicon oil on the contact surface
- Replace pressure roller
- Wipe the fusing unit bottom frame with a dry cloth (Europe/Asia model only)
- Replace hot roller blade
120K
240K
360K
Check developer setup results with SP3-964
1. Check the results in SP3-964 mode, then turn off the main switch (turning off main power resets the fusing-less mode).
2. Install the fusing and paper transfer units.
3. Turn on the main switch again.
Paper transfer unit
1. Replace the transfer roller blade.
2. Wipe the paper discharge corona casing with a dry cloth.
3. Replace the paper discharge corona wire.
4. Wipe the toner collection case with a dry cloth.
5. Replace the lubricant bar.
Make a copy and check image quality
Reset the counters
1PM: SP 7-804-001, 7-804-003
2PM: SP 7-804-002, 7-804-003
Check the power cord connection

A259P503.WMF

5.2 REGULAR PM ITEMS

Regular PM items: To be performed every 60,000 developments in accordance with the following table.

Regular PM Table

NOTE: To wipe off toner, use a dry cloth. If toner is mixed with alcohol, it solidifies.

❍: Inspect Δ: Lubricate ❑: Replace ●: Clean ▲: Adjust

Block	PM item	EM	Schedule						Remarks
			60 kD	120 kD	180 kD	240 kD	300 kD	360 kD	
Scanner unit	1st, 2nd, and 3rd mirrors		●	●	●	●	●	●	Wipe with a silicone cloth or optics cleaning paper. Use a cleaning tool (P/N H5159353) to clean the 1st mirror.
	Optical filter		●	●	●	●	●	●	Wipe with a dry cloth.
	Original sensor		●	●	●	●	●	●	Wipe with a dry cloth.
	Halogen lamp			❑		❑		❑	
	Exposure glass	●	●	●	●	●	●	●	Clean with water or alcohol.
	Platen cover	●	●	●	●	●	●	●	Wipe first with a damp cloth and then with a dry cloth.
	Dust filter		❑	❑	❑	❑	❑	❑	
Transport unit	Transport belt, transport belt drive gear, transfer belt mark sensor		●	●	●	●	●	●	Wipe with a dry cloth or clean with a vacuum cleaner.
	Toner shield glass		●	●	●	●	●	●	Wipe with a dry optics cleaning cloth (A0129111).
	Upper/lower registration rollers		●	●	●	●	●	●	Clean with water or alcohol.

Block	PM item	EM	Schedule						Remarks
			60 kD	120 kD	180 kD	240 kD	300 kD	360 kD	
Development unit	Development unit toner catch pan		●	●	●	●	●	●	Wipe with a dry cloth or clean with a vacuum cleaner.
	Developer (K)								Developer life is 60 kD.
	Developer (C, M, Y)								Developer life is 45 kD for each color. Replace the three colors at the same time.
	Development unit (including covers and gears)		●	●	●	●	●	●	Cover: wipe with a dry cloth. Gear: Clean with a blower brush.
	Side seal/entrance seal		❍	❍	❍	❍	❍	❍	Visually check. Replace if cracks, warps, or breakage are found.
	Color toner set sensor	●	●	●	●	●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Toner end sensor		●	●	●	●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Bias terminal on the development unit.		●	●	●	●	●	●	Wipe with a dry cloth (should be free of oil or foreign matters).
	Bias terminal on the copier/seal-development bias.		●	●	●	●	●	●	Wipe with a dry cotton cloth (should be free of oil or foreign matters).
Around drum	PCC		●	●	●	●	●	●	Wipe with a dry cloth.
	PCC wire		●	❑	●	❑	●	❑	Wipe with a dry cloth.
	Cleaning blade		❑	❑	❑	❑	❑	❑	When replacing, apply setting powder.
	Lubricant bar		❑	❑	❑	❑	❑	❑	
	Cleaning brush			❑		❑		❑	
	Cleaning unit and entrance mylar		●	●	●	●	●	●	Clean with a blower brush or wipe with a dry cloth.
	Drum unit (including QL and potential sensor)		●	●	●	●	●	●	Wipe with a dry cloth.
	Drawer unit (including ID sensor and carrier catcher)		●	●	●	●	●	●	Wipe with a dry cloth.
	Charge corona unit casing	●	●	●	●	●	●	●	Wipe with a dry cloth.
	Charge corona wire	●	●	❑	●	❑	●	❑	Wipe with a damp cloth, then with a dry cloth.
	Charge corona grid	●	●	❑	●	❑	●	❑	Wipe with a damp cloth, then with a dry cloth.
	Dust filter		❑	❑	❑	❑	❑	❑	

Block	PM item	EM	Schedule						Remarks
			60 kD	120 kD	180 kD	240 kD	300 kD	360 kD	
Transfer belt unit	Belt cleaning unit (toner catch pan and entrance seal)		●	●	●	●	●	●	Wipe with a dry cloth or clean with a vacuum cleaner.
	Belt cleaning blade		❑	❑	❑	❑	❑	❑	
	Belt lubricant bar		❍	❑	❍	❑	❍	❑	Replace when worn or cracked.
	Lubricant brush		❍	❑	❍	❑	❍	❑	Clean with a vacuum cleaner if it is too dirty.
	Transfer belt unit rollers		●	●	●	●	●	●	Wipe with a dry cloth.
	Transfer belt		❑	❑	❑	❑	❑	❑	Apply setting powder when replacing.
Paper feed unit	Paper pick-up roller, paper feed roller, paper separation roller	●		●		●		●	Clean with alcohol or water.
	By-pass pick-up roller, by-pass feed roller, by-pass separation roller	●		●		●		●	Clean with alcohol or water.
	Bottom plate pad	●		●		●		●	Wipe with a dry cloth.
	Vertical transport guide plate			●		●		●	Wipe with a dry cloth.
	Relay roller			●		●		●	Wipe with a dry cloth.
Others	Used toner tank		● / ❑	● / ❑	● / ❑	● / ❑	● / ❑	● / ❑	Empty and clean with a dry cloth, or replace the tank.
	Exhaust filter		❑	❑	❑	❑	❑	❑	

Block	PM item	EM	Schedule						Remarks
			60 kD	120 kD	180 kD	240 kD	300 kD	360 kD	
Fusing unit	Pressure cleaning roller			●		●		●	Wipe with a dry cotton cloth. (US model only)
	Pressure roller blade			❑		❑		❑	Europe/Asia model only
	Pressure roller pad		❑	❑	❑	❑	❑	❑	Europe/Asia model only
	Fusing unit bottom frame			●		●		●	Wipe with a dry cloth Europe/Asia model only
	Upper thermistor		●	●	●	●	●	●	Clean with a suitable solvent and apply silicone oil over the contact surface.
	Lower thermistor			●		●		●	Clean with a suitable solvent and apply silicone oil to the contact surface.
	Pressure roller			❑		❑		❑	
	Fusing cleaning roller		●	●	●	●	●	●	Wipe with a dry cotton cloth or clean with a suitable solvent.
	Heat isolating bushing		Δ	Δ	Δ	Δ	Δ	Δ	Wipe with a dry cotton cloth, then apply grease (Varrierta JFE552).
	Hot roller		❑	❑	❑	❑	❑	❑	
	Entrance guide plates (upper and lower)	●	●	●	●	●	●	●	Wipe with a dry cloth.
	Hot roller blade			❑		❑		❑	
	Oil supply pad		❑	❑	❑	❑	❑	❑	
	Cleaning roller scraper		●	●	●	●	●	●	Wipe with a dry cotton cloth or clean with a suitable solvent.
	Silicone oil	❍	Δ	Δ	Δ	Δ	Δ	Δ	After removing paper dust precipitated in the oil tank with a pipette, supply silicone oil.
Paper transfer unit	Transfer roller blade		❑	❑	❑	❑	❑	❑	
	Paper discharge corona casing		●	●	●	●	●	●	Wipe with a dry cloth.
	Paper discharge corona wire		❑	❑	❑	❑	❑	❑	
	Toner collection case		●	●	●	●	●	●	Wipe with a dry cloth.
	Lubricant bar		❑	❑	❑	❑	❑	❑	

Block	PM item	EM	Schedule						Remarks
			60 kD	120 kD	180 kD	240 kD	300 kD	360 kD	
Duplex unit	Paper feed separation roller		❑	❑	❑	❑	❑	❑	
	Paper feed roller		❑	❑	❑	❑	❑	❑	
	Duplex tray bottom plate pad	●		●		●		●	Wipe with a dry cloth.
	Duplex trays (mylar and feeler)	●		●		●		●	Wipe with a dry cloth.

❍: Inspect Δ: Lubricate ❑: Replace ●: Clean

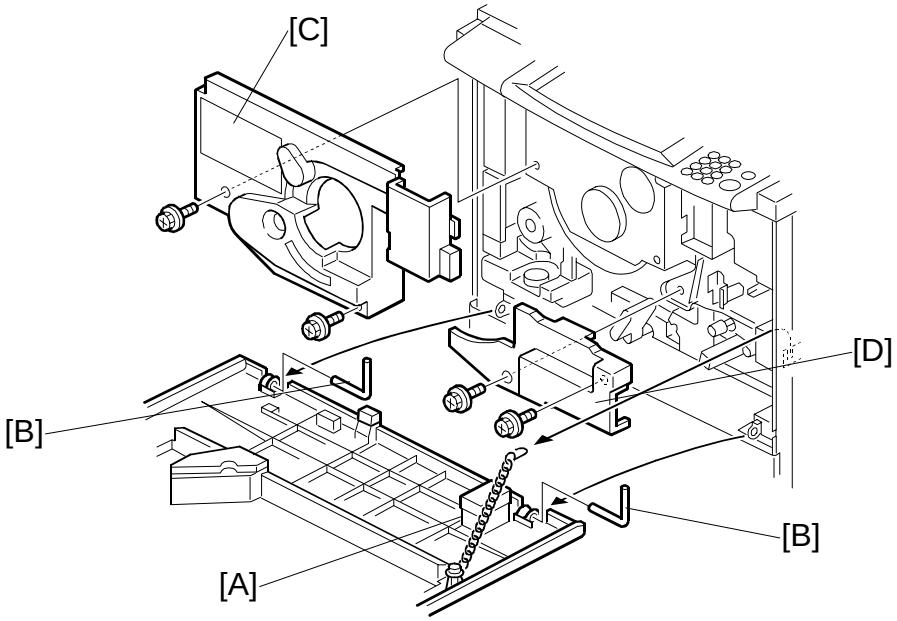
Block	PM Item		60 kD	120 kD	180 kD	240 kD	300 kD	360 kD	Action Post-maintenance action
Paper Tray Unit	Paper feed roller: Feed						❑		Clean each paper tray with a dry or damp cloth (cotton cloth). Guideline: Every 200,000 normal sheets
	Roller: Follower						●		Clean each paper tray with a dry or damp cloth (cotton cloth). Guideline: Every 200,000 normal sheets
	Transport roller: Drive						●		Clean each paper tray with a dry or damp cloth (cotton cloth). Guideline: Every 200,000 normal sheets
	Psf: Tray bottom plate						●		Clean each paper tray with a dry or damp cloth (cotton cloth). Guideline: Every 200,000 normal sheets
	Electromagnetic SL: Relay						❍		Guideline: Every 200,000 normal sheets
	Electromagnetic SL: Paper feed						❍		Check each paper tray. Guideline: Every 200,000 normal sheets
	Paper feed roller: Pick-up						❑		Each paper tray Guideline: Every 200,000 normal sheets
	Paper feed roller: Reverse						❑		Each paper tray Guideline: Every 200,000 normal sheets
ARDF	Transport belt	●		❑		❑		❑	Wipe with a damp cotton cloth. Guideline: Every 80,000 normal sheets
	Separation belt	●		❑		❑		❑	Wipe with a damp cotton cloth. Guideline: Every 80,000 normal sheets
	Separation roller	●		❑		❑		❑	Wipe with a damp cotton cloth. Guideline: Every 80,000 normal sheets
	Registration sensor			●		●		●	Clean with a blower brush. Guideline: Every 80,000 normal sheets
	Size sensor			●		●		●	Clean with a blower brush. Guideline: Every 80,000 normal sheets
	Paper exist sensor			●		●		●	Clean with a blower brush. Guideline: Every 80,000 normal sheets

Block	PM Item		60	120	180	240	300	360	Action Post-maintenance action
			kD	kD	kD	kD	kD	kD	
20 Bins Sorter	Transport roller	●							Clean with alcohol or cotton cloth if stained.
	Follower roller	●							Clean with alcohol or cotton cloth if stained.
	Bin	●							Clean with alcohol or cotton cloth if stained.
	Bin/stapler sensor	●							Clean with a blower brush
	Bearing	Δ							Lubricate if abnormal sound is heard (resin grease, G-501).
	Bin slider, spiral or helical, guide groove	Δ							Lubricate if abnormal sound is heard (resin grease, G-501).
	Stapler	❍							Stapler life: 100,000 staples
10 Bins Sorter	Transport roller	❍							Clean with alcohol or cotton cloth if contaminated.
	Follower roller	❍							Clean with alcohol or cotton cloth if contaminated.
	Bin	❍							Clean with alcohol or cotton cloth if contaminated.
	Entrance, bin, and stapler sensors	❍							Clean with a blower brush.
	Bin slider section	❍							Lubricate if abnormal sound is heard (resin grease, G-501).
	Bearing	❍							Lubricate if abnormal sound is heard (silicone oil or Launa oil).
	Stapler	❍							
3 Bins Sorter	Transport roller	●							Clean with alcohol or cotton cloth if stained.
	Follower roller	●							Clean with alcohol or cotton cloth if stained.
	Reflection type sensor	●							Clean with a blower brush
	Bearing	Δ							Lubricate if abnormal sound is heard (silicone oil or Launa oil).
	Follower roller	Δ							Lubricate if abnormal sound is heard (silicone oil or Launa oil).
	Worm, worm wheel	Δ							Lubricate if abnormal sound is heard (resin grease, G-501).

6. REPLACEMENT AND ADJUSTMENT

6.1 COVERS, FANS, AND FILTERS

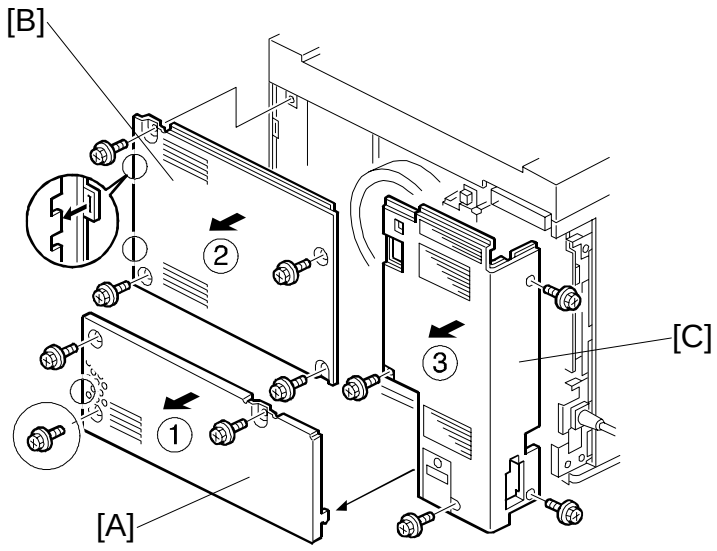
6.1.1 FRONT, INNER, AND INNER TRANSFER COVERS



A259R901.WMF

1. Remove the chain [A] from the hook.
2. Remove the pins [B] (two) from the hinges.
3. Remove the front cover.
4. Remove the inner cover [C] (2 screws).
5. Remove the inner transfer cover [D] (2 screws).

6.1.2 REAR COVERS

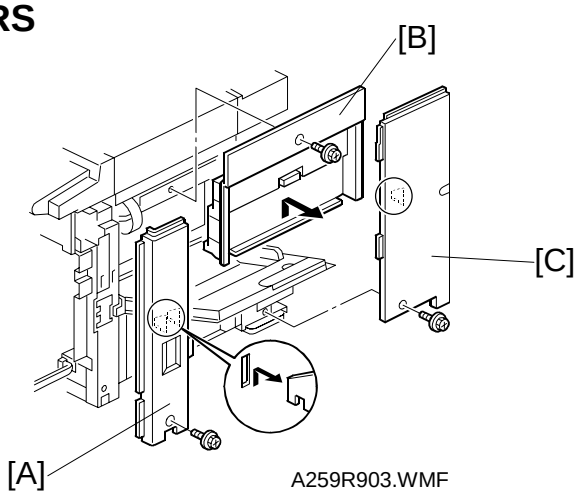


A259R902.WMF

NOTE: When removing the covers, follow the step order. When installing the covers, follow the removal procedure in reverse.

1. Remove the used toner cover [A] (3 screws).
2. Remove the rear cover [B].
3. Remove the left rear cover [C] (3 screws).

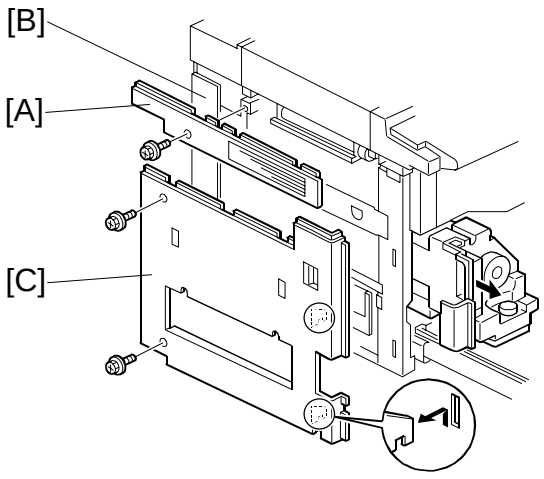
6.1.3 RIGHT COVERS



A259R903.WMF

1. Open the front cover.
2. Remove the right front cover [A] (1 screw).
3. Remove the right cover [B] (1 screw).
4. Remove the used toner and rear covers (see “Rear Covers”).
5. Remove the right rear cover [C] (1 screw).

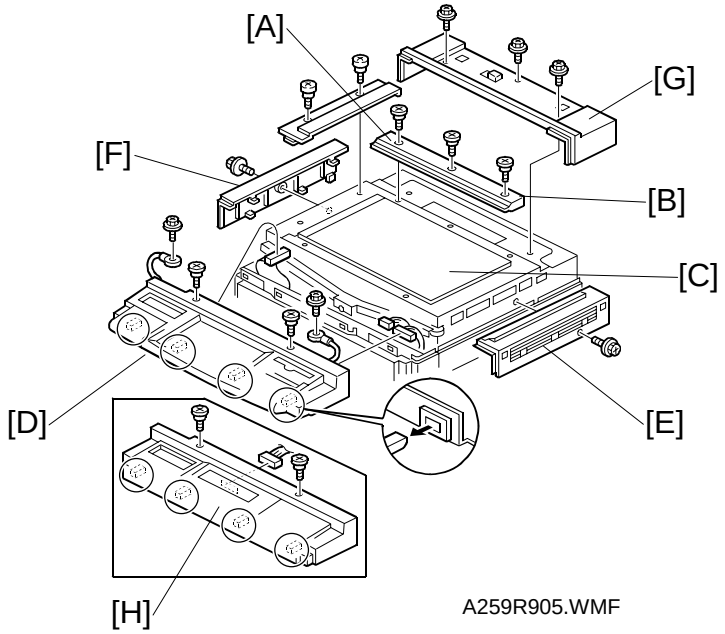
6.1.4 LEFT COVERS



A259R904.WMF

1. Remove the left center cover [A] (1 screw).
2. Open the front cover and pull out the fusing unit slightly.
3. Remove the left rear cover [B] (see “Rear Covers”).
4. Remove the left cover [C] (2 screws).

6.1.5 EXPOSURE GLASS



1. Remove the vertical scale [A] (2 screws).
2. Remove the horizontal scale [B] (3 screws).
3. Remove the exposure glass [C].

NOTE: When reinstalling the exposure glass, ensure that the white plate faces down and to the left.

6.1.6 OPERATION PANEL

– A258 only –

1. Remove the operation panel [H] (2 screws and 1 connector).

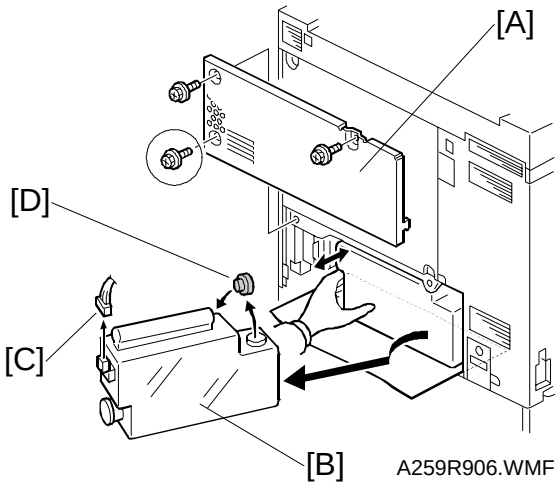
– A259/A260 only –

1. Remove the operation panel [D] (2 screws, 2 grounding wires, and 3 connectors).
   NOTE: Perform the touch panel calibration procedure after replacing the operation panel (see "Touch Panel Calibration").

6.1.7 UPPER COVERS

1. Remove the upper right cover [E] (1 screw).
2. Remove the upper left cover [F] (1 screw).
3. Remove the upper rear cover [G] (1 screw).

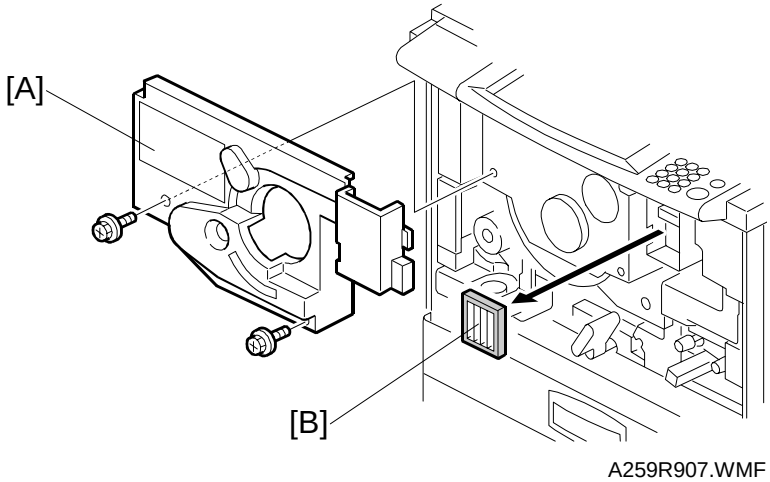
6.1.8 USED TONER TANK



NOTE: Place a mat on the floor to keep the floor clean before doing this procedure.

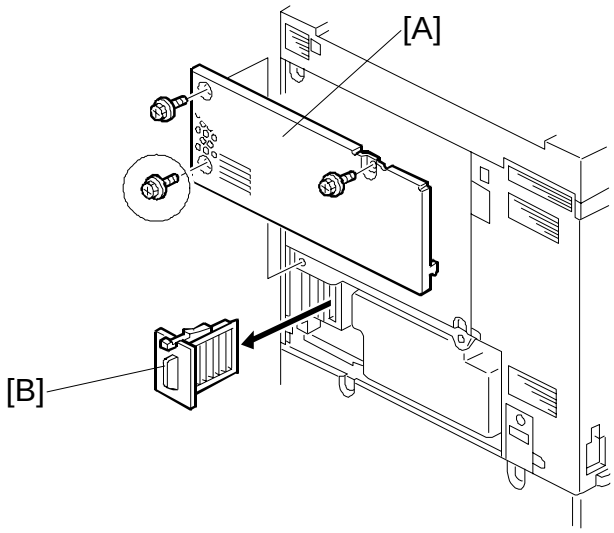
1. Remove the used toner cover [A] (3 screws).
2. Pull out the used toner tank [B].
3. Disconnect the cable [C] and remove the cap [D].

6.1.9 CHARGE CORONA FAN FILTER



1. Remove the inner cover [A] (2 screws).
2. Pull out the charge corona fan filter [B].

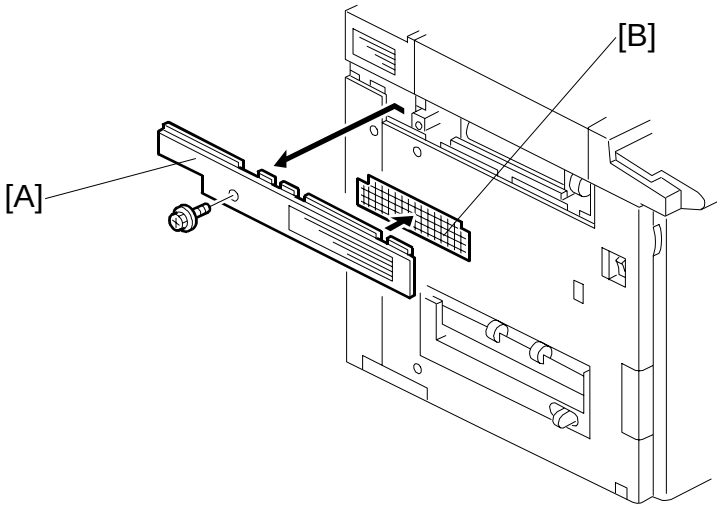
6.1.10 MAIN EXHAUST FAN FILTER



A259R908.WMF

1. Remove the used toner cover [A] (3 screws).
2. Pull out the main exhaust fan filter [B].

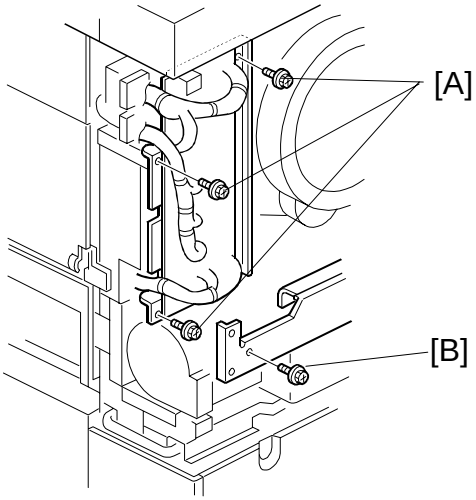
6.1.11 SCANNER EXHAUST FAN FILTER



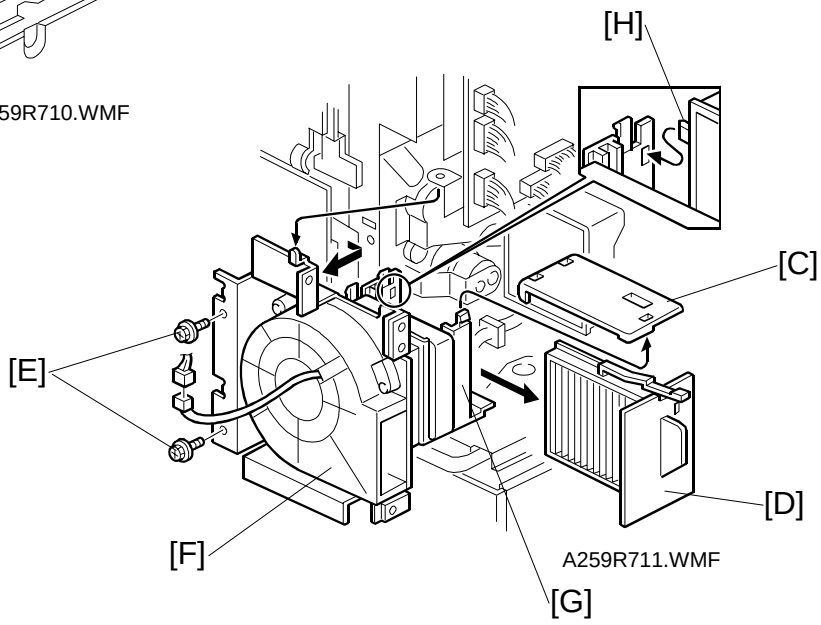
A259R909.WMF

1. Remove the left center cover [A] (1 screw).
2. Remove the scanner exhaust fan filter [B].

6.1.12 MAIN EXHAUST FAN



A259R710.WMF



A259R711.WMF

NOTE: Place a mat on the floor to keep the floor clean before doing this procedure.

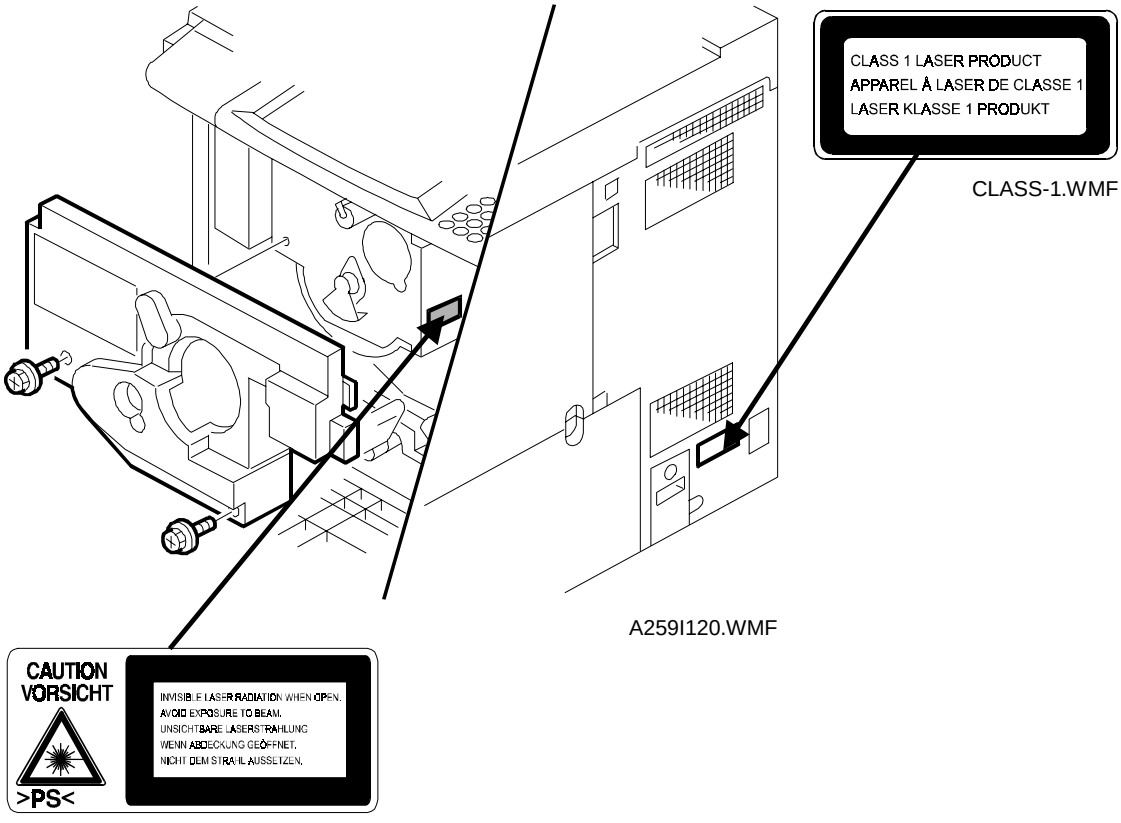
1. Remove the used toner rear cover and rear cover (see "Rear Covers").
2. Remove the right rear cover (see "Right Covers").
3. Remove three mounting screws [A] from the I/O control board.
4. Remove the mounting screw [B] from the rear cover bracket.
5. Remove the main exhaust fan filter top cover [C] (1 claw) and the main exhaust fan filter [D].
6. Remove the main exhaust fan mounting (2 screws [E]) and remove the main exhaust fan [F] with the main exhaust fan dust filter bracket [G] (while disengaging two connectors, one for the fan and one for the temperature/humidity sensor, and the duct opening claw [H]).

6.2 DRUM UNIT

⚠WARNING
Turn off the power and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.

CAUTION DECAL LOCATIONS

Two caution decals are located as shown below.



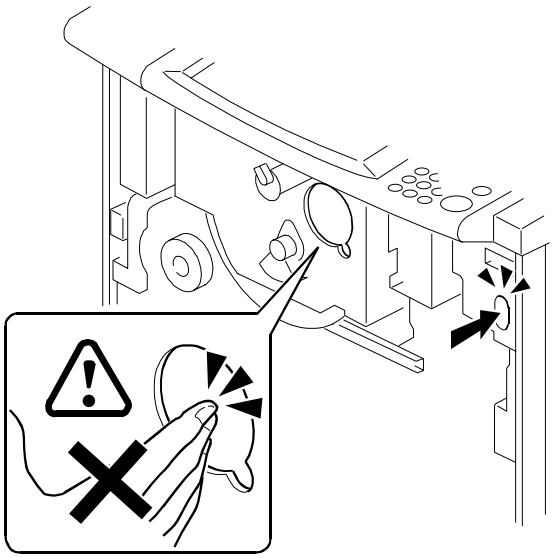
CLASS-1.WMF

A259I120.WMF

LASER-4.WMF

⚠DANGER
Be sure to turn off the main switch and disconnect the power plug from the power outlet before attempting any disassembly or adjustment of the laser unit. This copier uses a class 1 laser beam with a wavelength of 780 nm and an output of 15 mW. The laser can seriously damage your eyes.

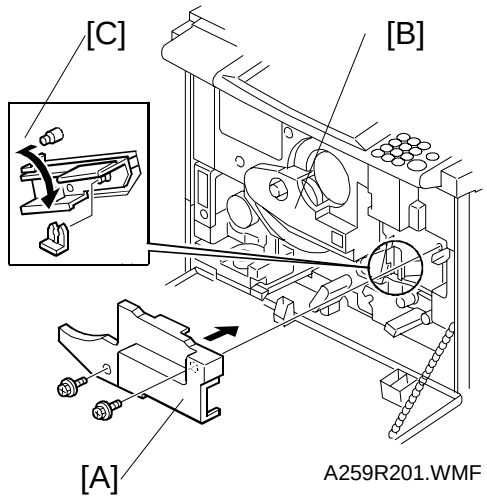
⚠CAUTION



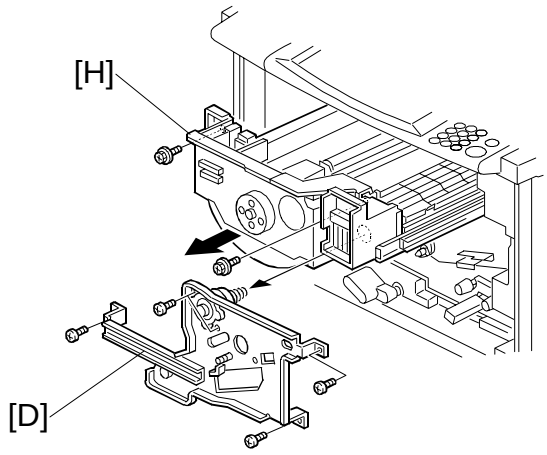
A259R310.WMF

DO NOT TOUCH the revolver unit, the toner cartridge, the toner end sensor, or the toner cartridge sensor, while the front door switch is actuated. This is because the revolver might rotate automatically due to a timed process control self check, or if the start key is pressed.
To disable the timed process control self check, SP 3-972 should be 0. The default is 6 (hours). If you change this SP mode setting, you should reset it to 6 after finishing your work.

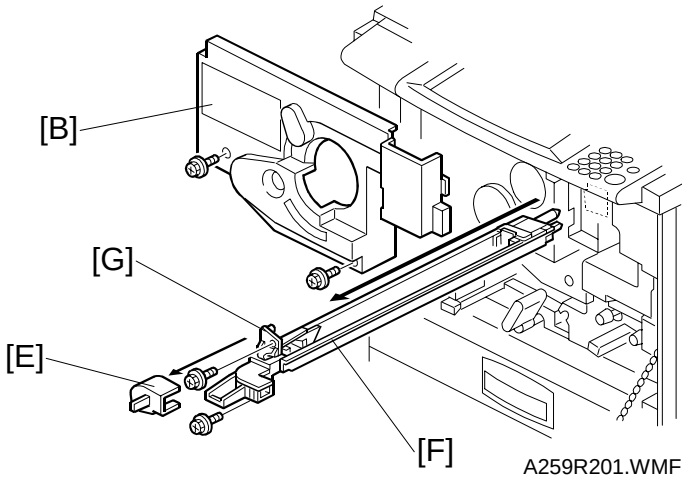
6.2.1 PULLING OUT THE REVOLVER/DRUM DRAWER



A259R201.WMF



A259R204.WMF



A259R201.WMF

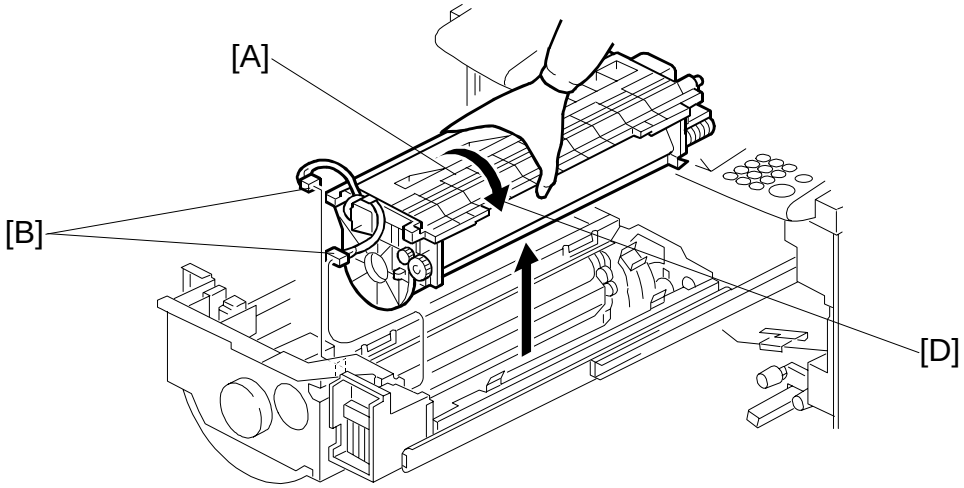
NOTE: Place a mat on the floor to keep the floor clean before performing these procedures.

1. Remove the following covers in the indicated order (see "Covers, Fans, and Filters"):
   1) Front cover
   2) Inner transfer cover [A]
   3) Inner cover [B] (See “Charge Corona Fan Filter Removal”.)
2. Release the transfer belt tension [C] (1 clamp) and remove the transfer belt stay [D] (5 screws).
3. Remove the charge duct cover [E] and the charge corona unit [F] with the corona cleaner [G] (2 screws).
4. Pull out the drawer unit [H] (2 screws).

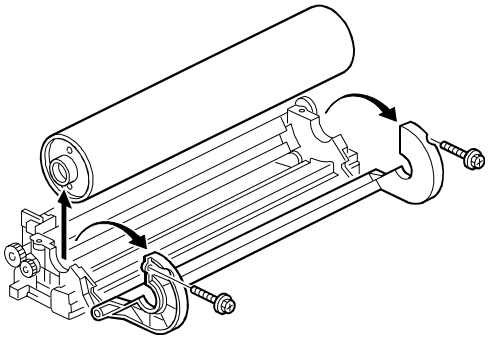
NOTE: 1) After pulling out the drawer unit, pull out the drum unit (2 connectors) and shield the drum unit from light with a black sheet or 5 (or more) white sheets of paper.

2) If the drawer unit is left out, the drum is exposed to light. This may cause optical fatigue, resulting in image anomalies (see "Troubleshooting – Drum Light Fatigue"). Therefore after pulling out the drawer unit, remove the drum unit (2 connectors) and cover it with a black sheet or 5 (or more) white sheets of paper.

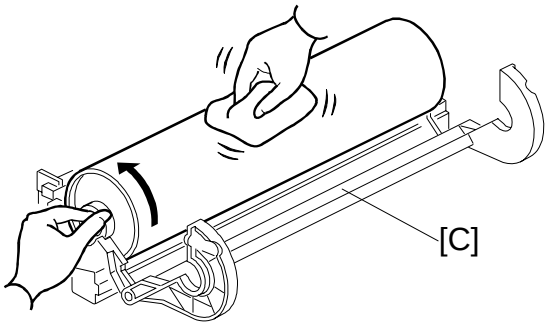
6.2.2 DRUM REPLACEMENT



A259R204.WMF



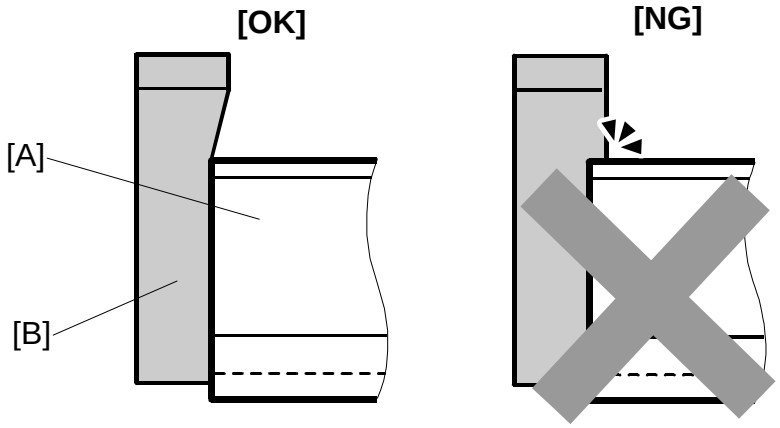
A259R205.WMF



A259R211.WMF

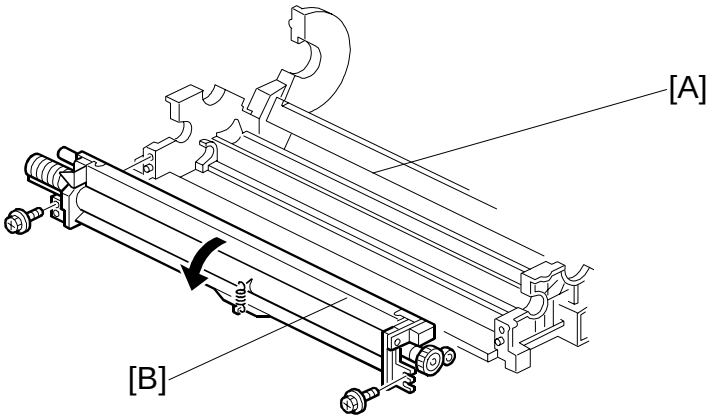
1. Remove the connectors [B] (2) and lift out the drum unit [A].
2. Turn the drum unit upside down, so that it rests as shown in the bottom left diagram, and remove the 2 screws.
   NOTE: When placing the drum unit in the work area, it is important to turn it upside down while removing it as shown [D]. This prevents toner spillage.
3. Open the drum unit and remove the drum.
4. Install the new drum and apply setting powder [C] to the entire drum surface.
   NOTE: Be sure to apply the setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.
5. Rotate the drum forward two or three times to settle the setting powder between the drum surface and cleaning blade by applying pressure to the cleaning blade.
   NOTE: Do NOT touch the drum more than 10 mm from either edge.
6. Install the drum unit in the reverse order of disassembly.
   1. After replacing the drum, be sure to perform the process control self-check on the new drum. See 6.6.3. "Post Developer Collection Procedure" for instructions.

NOTE: 1) After replacing the drum or the cleaning blade, rotate the drum forward two or three times to settle the setting powder between the drum surface and the cleaning blade.
2) When installing the cleaning blade [A], make sure that the front and rear ends of the blade do not rest over the cleaning unit side seal [B].

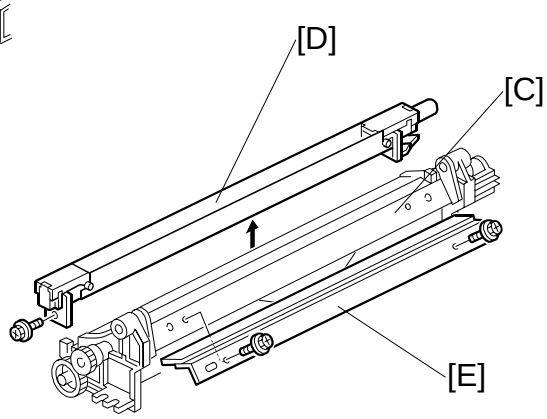


A259R217.WMF

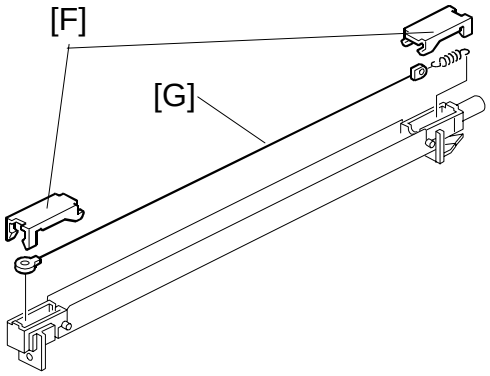
6.2.3 CLEANING BLADE AND PCC WIRE REPLACEMENT



A259R213.WMF



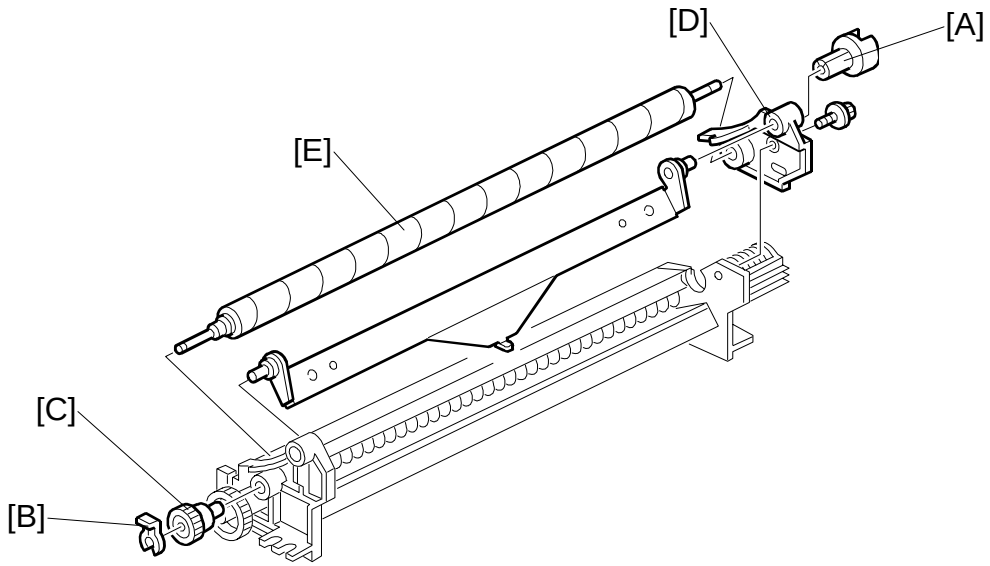
A259R216.WMF



A259R210.WMF

2. Remove the drum unit [A] and place it in the work area (see “Drum Replacement”).
3. Remove the cleaning unit [B] from the drum unit (2 screws).
4. Remove the cleaning blade [E] from the cleaning unit [C] (2 screws).
5. Remove the PCC [D] from the cleaning unit (1 screw).
6. Remove the front and rear end blocks [F] from the PCC.
7. Replace the PCC wire [G].
   NOTE: Apply setting powder to the drum surface after replacing the cleaning blade. Be sure to apply the setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.
8. Assemble the drum unit in the reverse order of disassembly.
   NOTE: 1. After replacing the drum or the cleaning blade, rotate the drum forward two or three times to settle the setting powder between the drum surface and the cleaning blade.
   2. When installing the cleaning blade, make sure that the front and rear ends of the blade do not rest over the cleaning unit side seal.

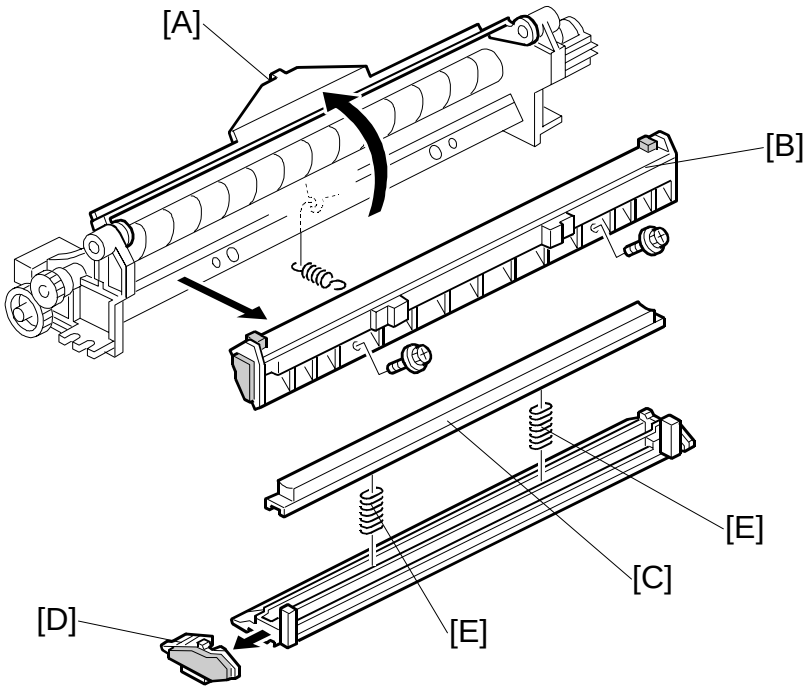
6.2.4 CLEANING BRUSH REPLACEMENT



A259R212.WMF

1. Remove the drum unit and place it in the work area (see “Drum Replacement”).
2. Remove the cleaning unit from the drum unit (2 screws) (see “Cleaning Blade and PCC Wire Replacement”).
3. Remove the coupling gear [A] from the rear of the cleaning unit (1 hook).
4. Remove the snap ring [B] and gear [C] securing the front side.
5. By pushing the front end of the brush shaft towards the rear, remove the rear panel [D] from the cleaning unit, then remove the cleaning brush [E] (1 screw).

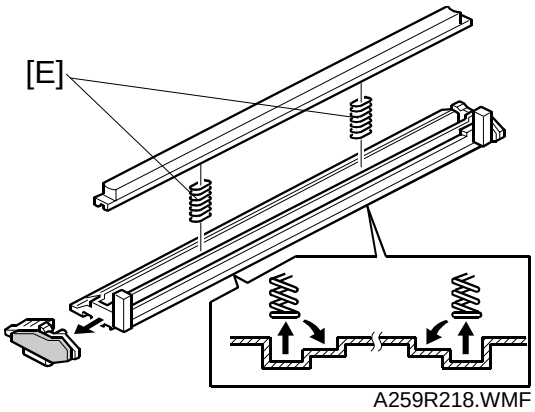
6.2.5 LUBRICANT BAR REPLACEMENT



A259R208.WMF

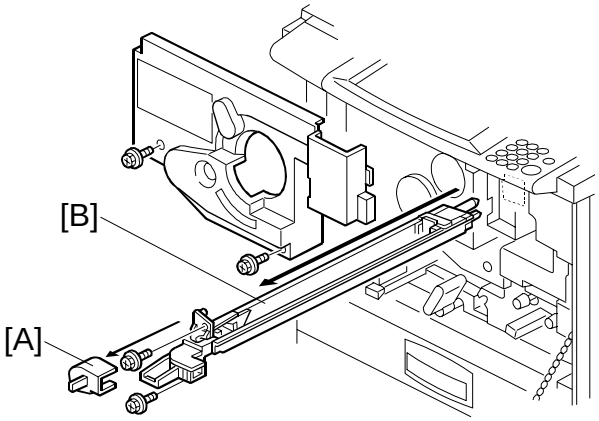
1. Remove the drum unit and place it in the work area (see “Drum Replacement”).
2. Remove the cleaning unit from the drum unit (2 screws) (see “Cleaning Blade and PCC Wire Replacement).
3. Remove the cleaning blade (see “Cleaning Blade and PCC Wire Replacement”).
4. Turn up the pressure release lever [A] (1 spring).
5. Remove the lubricant holder [B] (2 screws).
6. Slide out the front end of the holder [D] and remove the lubricant bar [C].

NOTE: The lubricant bar springs [E] can be installed in two positions. When installing a new lubricant bar, place the springs in the deeper position. If cleaning problem should occur. Change the position of the springs to compensate for the wear of the lubricant bar.

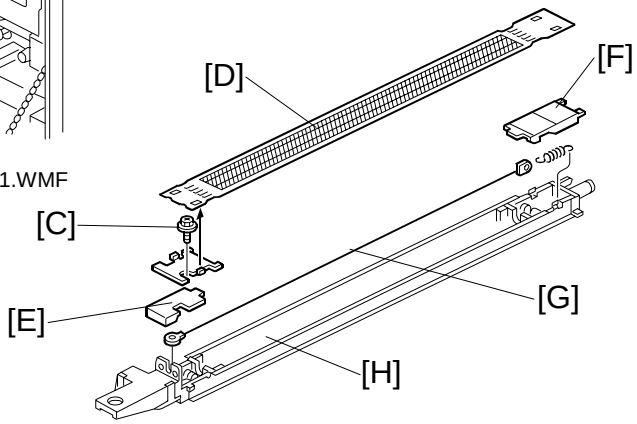


A259R218.WMF

6.2.6 CHARGE CORONA GRID AND WIRE REPLACEMENT



A259R201.WMF

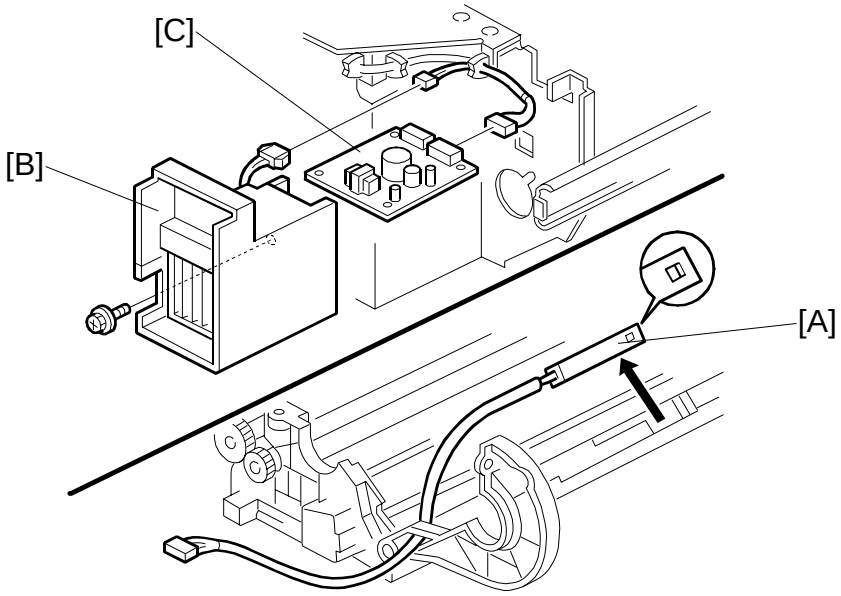


A259R202.WMF

1. Remove the charge corona duct cover [A].
2. Remove the charge corona unit [B] with the corona cleaner (2 screws).
3. Replace the grid.
   1) Unscrew the screw [C] (1 screw).
   2) Remove the grid [D] and replace it.
4. Remove the corona wire.
   1) Remove the front [E] and rear end [F] covers from the corona unit [H].
   2) Replace the corona wire [G].

NOTE: 1) Do NOT touch the corona wire directly. Skin oils can damage the corona wire over time, causing uneven charging.
2) Do NOT bend the corona wire. If the wire is bent, it will not discharge uniformly. This causes uneven charging.
3) Put both ends of the corona wire in the end block slots.
4) Replace the front end block cover first. If the rear end block cover is replaced before the front cover, the corona wire may catch on the corona wire case slot. This may damage the wire.

6.2.7 POTENTIAL SENSOR REPLACEMENT



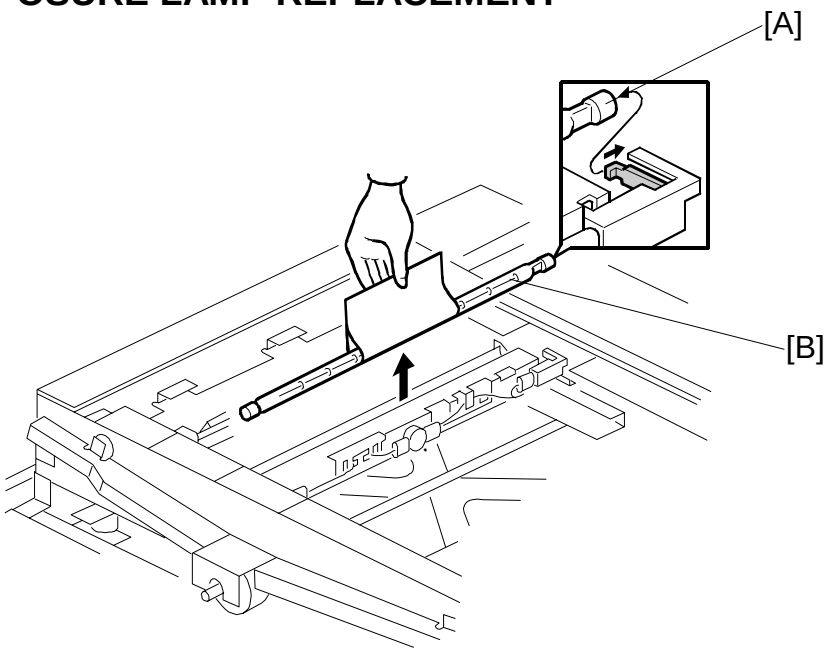
A259R206.WMF

NOTE: The potential sensor consists of a sensor element and a control board. You must replace both the sensor and the control board at the same time.

1. Remove the drum (see “Drum Replacement”).
2. Replace the potential sensor [A].
3. Remove the charge corona fan [B] from the drawer unit (1 screw, 1 connector).
4. Replace the potential sensor control board [C] (1 connector).

6.3 SCANNER UNIT

6.3.1 EXPOSURE LAMP REPLACEMENT

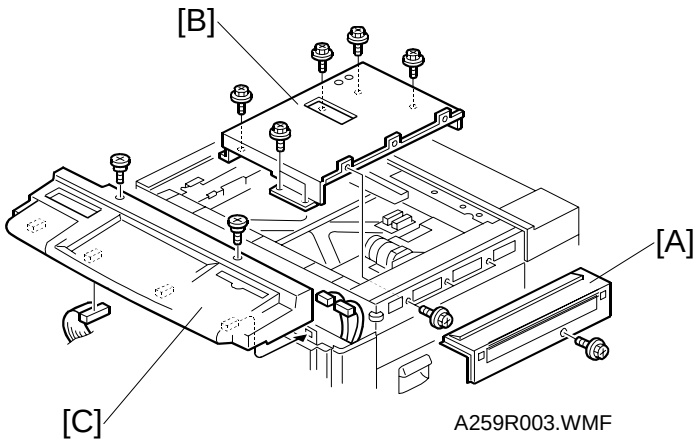


A259R005.WMF

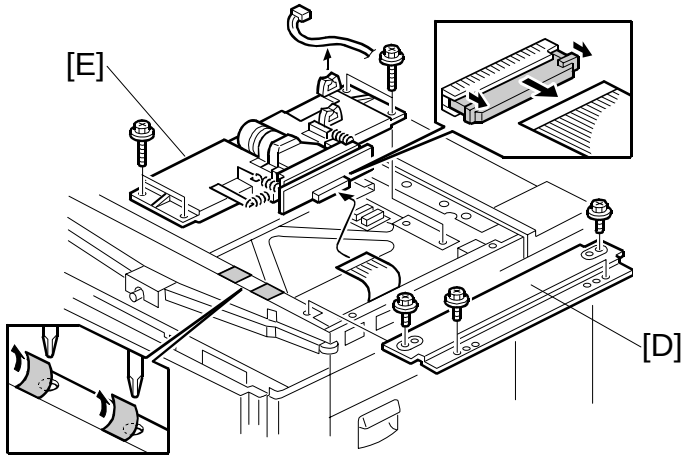
1. Remove the exposure glass (see “Covers, Fans, and Filters”).
2. Move the first scanner next to the opening in the frame.
3. Push the exposure lamp terminal [A] in the direction shown, and remove the lamp [B].
4. Install the new lamp in the reverse order of disassembly.
   NOTE: Do NOT touch the glass surface of the new lamp.

Ask the user to do the ACC procedure after replacing the lamp.

6.3.2 SBU REPLACEMENT



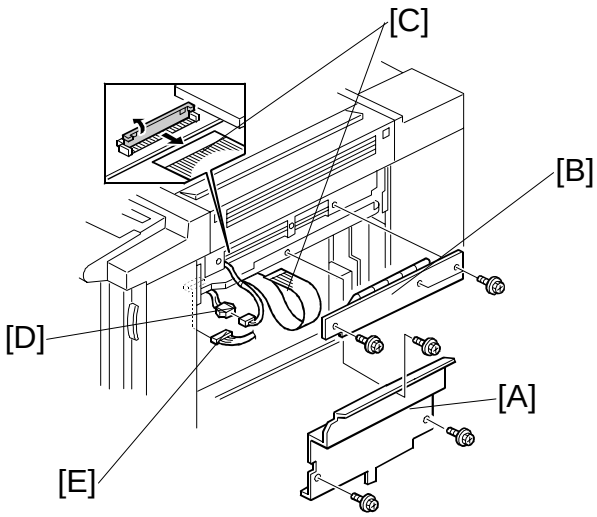
A259R003.WMF



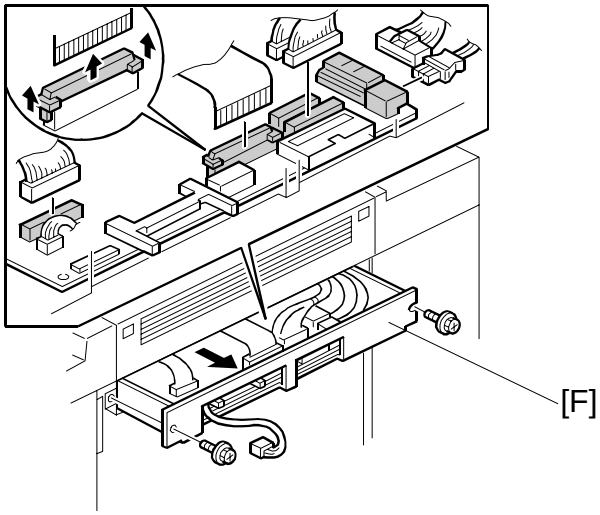
A259R004.WMF

1. Remove the exposure glass (see Covers, Fans, and Filters).
2. Remove the upper right cover [A] (see Covers, Fans, and Filters).
3. Remove the scanner inner cover [B] (9 screws).
4. Remove the operation panel [C] (see Covers, Fans, and Filters).
5. Remove the upper right stay [D] (4 screws).
6. Disconnect the SBU [E] and APS sensor connectors.
7. Remove the SBU [E] (4 screws).
8. Do the user mode ACC procedure. If necessary adjust the ACC targets and/or the KCMY color balance.

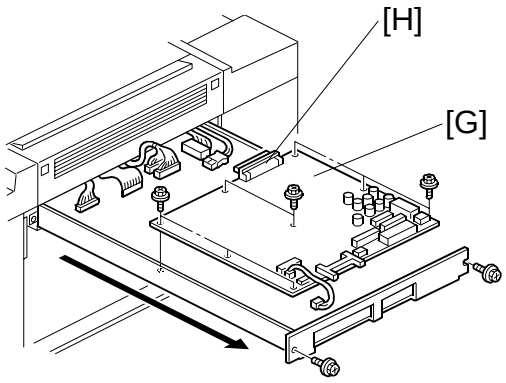
6.3.3 SCANNER IPU BOARD REPLACEMENT



A259R020.WMF



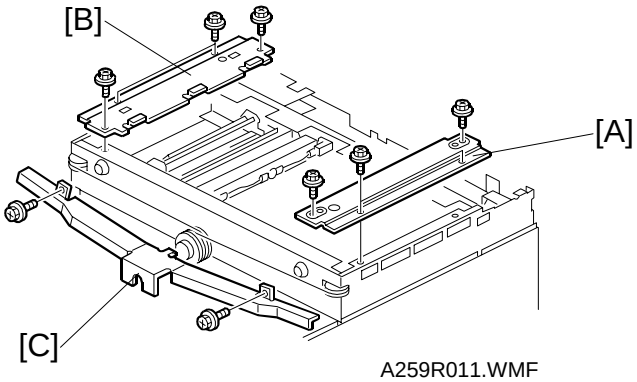
A259R014.WMF



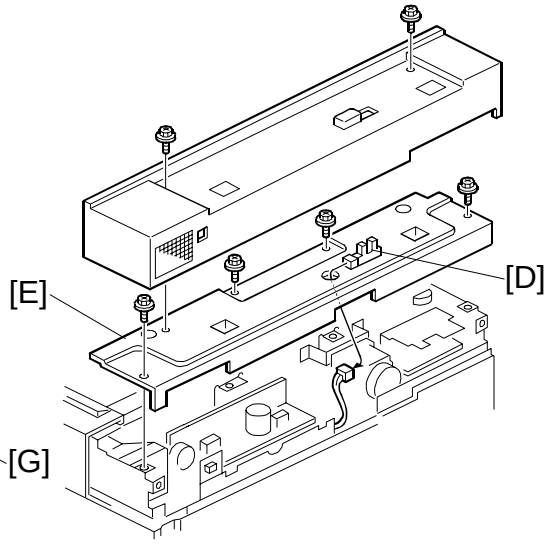
A259R007.WMF

1. Remove the right cover (see section 6.1).
2. **A259/A260 only:** Remove the shield plate [A] (3 screws).
3. Remove the Flash ROM card cover [B] (3 screws).
4. Disconnect the LD flat cable [C] and connector [D] (also disconnect CN312 [E] on the main control board for A260).
5. Pull out the IPU base slightly [F] (2 screws).
6. Disconnect CN404, CN407, and CN408 on the scanner IPU board (3 connectors).
7. Pull out the IPU base further and unplug 6 more connectors.
8. Fully pull out the IPU base [F], and unscrew the 8 screws on the scanner IPU board [G].
9. Take out the scanner IPU board [G] while turning it toward you, and disconnect the IDU connector [H].

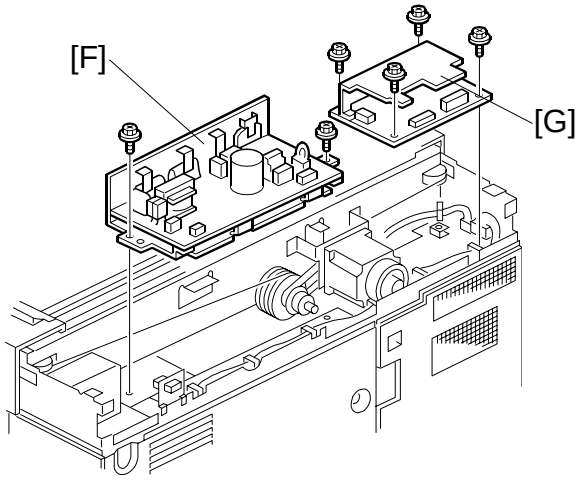
6.3.4 SCANNER WIRE/SCANNER MOTOR REPLACEMENT



A259R011.WMF

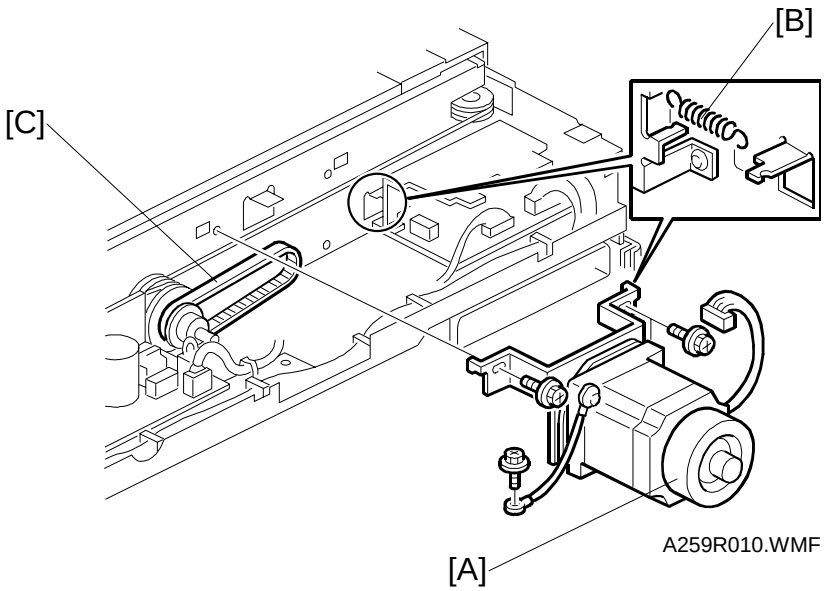


A259R008.WMF

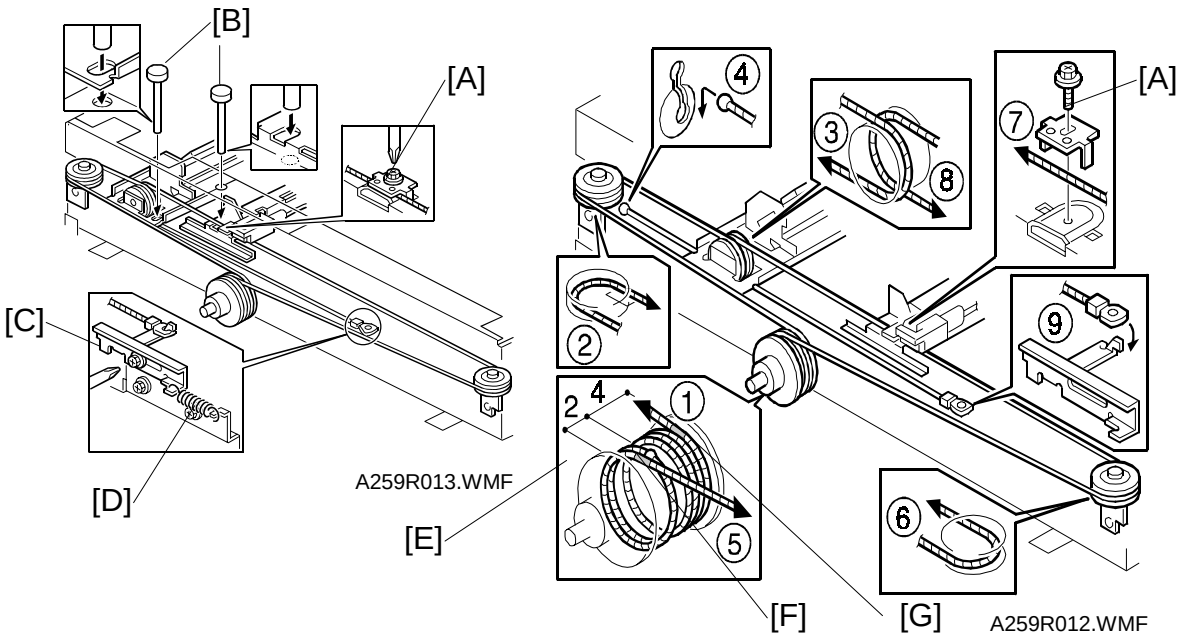


A259R009.WMF

1. Remove the exposure glass and the exterior covers.
2. Remove the upper right stay [A] (4 screws) and the upper left stay [B] (4 screws).
3. To change the front scanner wire: Remove the wire cover [C] (2 screws).
   To change the rear scanner wire: Do the following.
   a) Disconnect the platen cover position sensor [D] and remove the platen cover frame [E] (4 screws).
   b) Remove the lamp regulator [F] (2 screws) and scanner drive board [G] (4 screws).



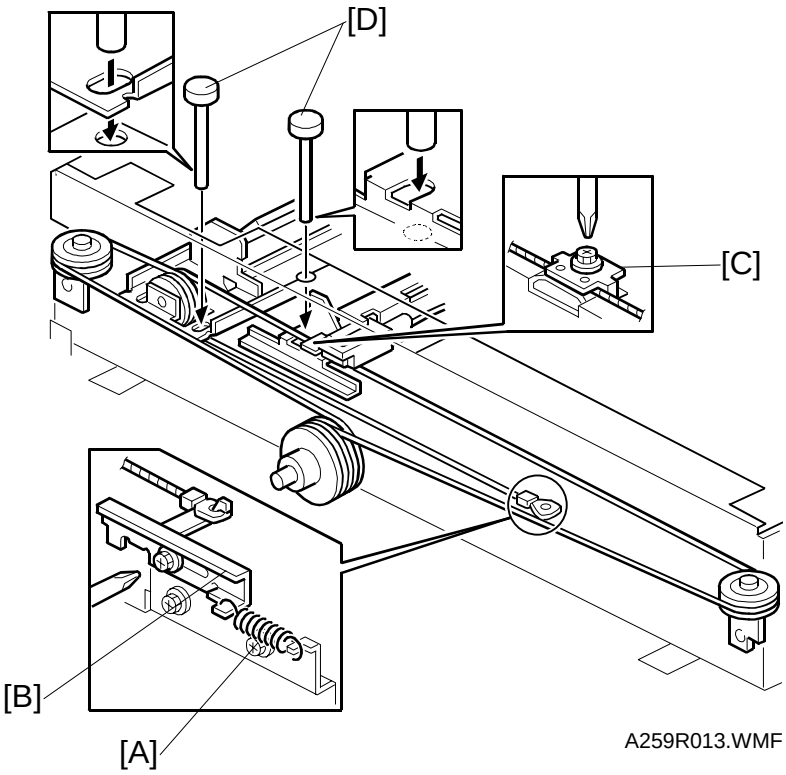
4. Remove the scanner motor [A] (1 connectors, 1 ground wire, 4 screws, 1 tension spring [B], 1 timing belt [C].
   NOTE: When reinstalling the scanner motor, pull the timing belt taut with the tension spring.



5. Loosen the wire clamp screw [A] and remove the scanner wire. Then loosen the clamp screw on the side where the wire will not be replaced.
6. Route the new scanner wire as shown. Take care to thread the wire on the pulley the correct way round. One end of wire has a ball attached to it, and the other end has a ring.
   1) Secure the first and second carriages on the scanner with 4 scanner locking pins [B] (2 on each side).
      NOTE: The correct scanner locking position is such that the scanner locking pins slide out smoothly.
   2) Loosen the wire tension bracket retaining screw [C] and remove the spring [D] then secure the tension bracket retaining screw temporarily.
   3) Place the ball located at the center of the wire in the groove on the pulley (①) and wind the wire the number of turns shown in the drawing on the right [E].

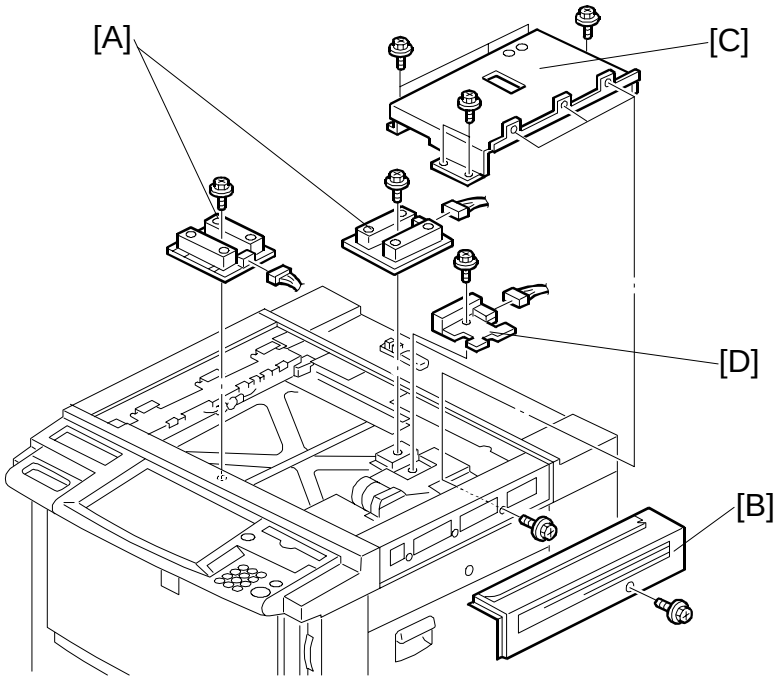
      NOTE: Winding procedure: Wind two turns outward (clockwise) from the ball at the center of the wire (up to the red mark [F]), then 4 turns inward (counterclockwise) (up to the black mark [G]). Wind a total of 7 turns including the one for the center ball.

   4) Route the end of the wire that has the ball through the pulleys as shown (② and ③), then fit the ball into the slot in the frame (④).
   5) Route the end of the wire that has the ring through the pulleys as shown (⑤, ⑥, ⑦, and ⑧), then hook the ring onto the wire tension bracket (⑨).



7. Hook the spring [A] onto the wire tension bracket [B], then loosen and retighten the screw permanently.
8. Secure the wire with the scanner wire clamp [C].
9. Remove the scanner locking pins [D].
10. Replace all the parts removed earlier, except for those removed in step 1.
11. After tensioning the wire by executing a scanner free run (SP mode 4-013-001), reset the scanner locking pins [D]. If the pins do not properly fit into the holes, loosen and reset the scanner wire clamp [C] so that the pins properly fit into the holes.
12. Replace the parts removed in step 1.

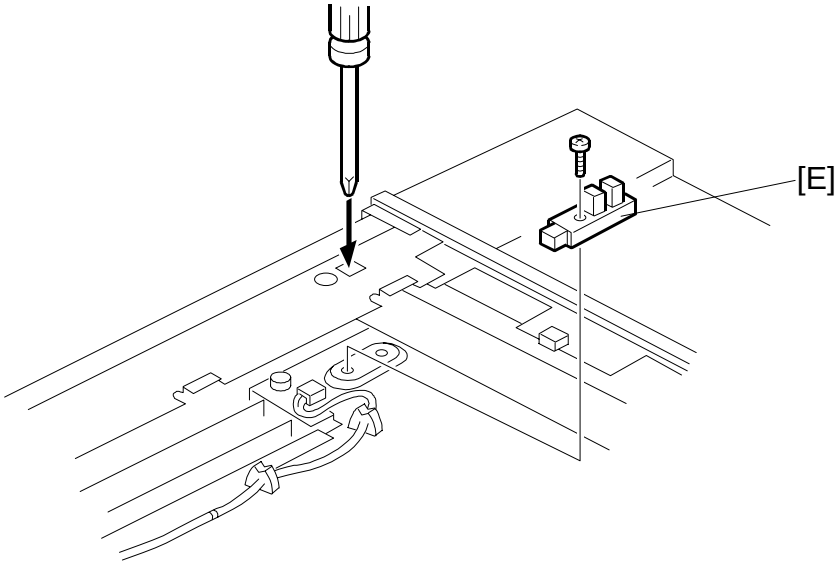
6.3.5 APS SENSORS



A259R002.WMF

1. Remove the exposure glass.
2. Replace the APS sensors [A] (1 screw and 1 connector).
3. Remove the upper right cover [B] (1 screw) and the scanner inner cover [C] (9 screws).
4. Remove the APS sensor [D] (1 screw and 1 connector).

6.3.6 SCANNER HP SENSOR



A259R015.WMF

1. Remove the exposure glass (see section 6.1.).
2. Remove the upper left cover (see section 6.1.).
3. Remove the scanner HP sensor [E] (1 screw, 1 connector).

6.4 COPY IMAGE ADJUSTMENT

6.4.1 PRINTER GAMMA ADJUSTMENT

Setting the KCMY standard values

Use the auto color calibration function (see the Operating Instructions).

Gamma Data Print Out

Use SP 7-904 to print the current printer gamma settings for copier and printer mode.

SP 7-904-1 prints a list for copier mode. SP 7-904-2 prints a list for printer mode.

NOTE: This list cannot be printed on paper shorter than A4/LT length.

KCMY color balance adjustment

The printer gamma curve created during the auto color calibration can be modified using SP mode. Use only the offset adjustments.

NOTE: Do not use the 'option' adjustments.

The greater the value of low ID, middle ID, high ID, and ID max, the higher the density is.

Low ID	Levels 2 through 5 in the C4 chart 10-level scale
Middle ID	Levels 3 through 7 in the C4 chart 10-level scale
High ID	Levels 6 through 9 in the C4 chart 10-level scale
IDmax	Level 10 in the C4 chart 10-level scale (affects the entire range of image density)

SP7-904 (printer gamma printout) can be used to print the current values.

There are three adjustable modes:

- Text mode
- Photo mode
- B/W text mode

Also, there are separate adjustments for copier and printer mode.

Copy mode

		K	C	M	Y
Text mode	Low ID	4-910-001	4-911-001	4-912-001	4-913-001
	Middle ID	4-910-002	4-911-002	4-912-002	4-913-002
	High ID	4-910-003	4-911-003	4-912-003	4-913-003
	IDmax	4-910-004	4-911-004	4-912-004	4-913-004
Photo mode	Low ID	4-915-001	4-916-001	4-917-001	4-918-001
	Middle ID	4-915-002	4-916-002	4-917-002	4-918-002
	High ID	4-915-003	4-916-003	4-917-003	4-918-003
	IDmax	4-915-004	4-916-004	4-917-004	4-918-004
B/W text mode	Low ID	4-914-001			
	Middle ID	4-914-002			
	High ID	4-914-003			
	IDmax	4-914-004			

Printer mode

		K	C	M	Y
Text mode and photo mode	Low ID	4-919-001	4-920-001	4-921-001	4-922-001
	Middle ID	4-919-002	4-920-002	4-921-002	4-922-002
	High ID	4-919-003	4-920-003	4-921-003	4-922-003
	IDmax	4-919-004	4-920-004	4-921-004	4-922-004

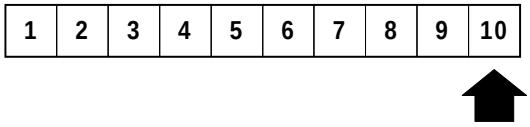
Adjustment procedure

1. Copy a C-4 chart in text mode. Compare the copy with the chart.
2. Enter SP mode.
3. Open SP 4-XX-X for text mode (see the above tables for the SP numbers).
4. Adjust the offset values until the copy quality conforms to the standard. (The diagrams at the end of this procedure explain the ID ranges affected by each setting.)
5. Copy a C-4 chart in photo mode. Compare the copy with the chart.
6. Open SP 4-XX-X for photo mode (see the above tables for the SP numbers).
7. Adjust the offset values until the copy quality conforms to the standard.
8. Copy the C-4 chart in auto text/photo mode.
9. Examine the photo part (lower half of the image) on the C-4 chart. Compare the copy with the chart. Proceed to the next step if color displacement errors are found. Terminate the adjustment if the check proves normal.
10. Adjust the offset for low ID within the range of +_2.

Standard Copy Quality

IDmax: (K, C, M, and Y)

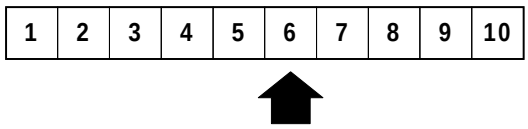
Adjust the offset value so that the density of level 10 matches the C-4 chart.



A259R561.WMF

Middle ID: (K, C, M, and Y)

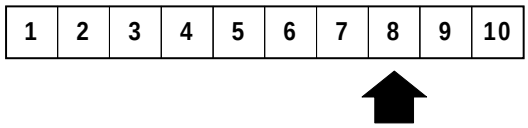
Adjust the offset value so that the density of level 6 matches the C-4 chart.



A259R562.WMF

High ID: (K, C, M, and Y)

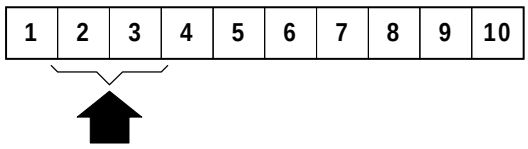
Adjust the offset value so that the density of level 8 matches the C-4 chart.



A259R563.WMF

Low ID: (K, C, M, and Y)

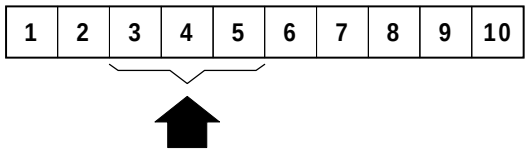
Adjust the offset value so that level 2 is just visible in the copy image and the density of level 3 matches the C-4 chart.



A259R564.WMF

K Low ID: (C, M, and Y) – Do for photo mode only

Adjust the offset value so that the color balance of black scale levels 3 through 5 in the copy is seen as gray.



A259R565.WMF

6.4.2 ACC TARGET ADJUSTMENT

The ACC targets can be adjusted with SP 4-501 and 4-502. This should be done after the SBU is replaced.

The SP modes to adjust are as follows.

Copier: 4-501	Printer: 4-502
4-501-001: Text K	4-502-001: Text/Photo K
4-501-002: Text C	4-502-002: Text/Photo C
4-501-003: Text M	4-502-003: Text/Photo M
4-501-004: Text Y	4-502-004: Text/Photo Y
4-501-005: Photo K	
4-501-006: Photo C	
4-501-007: Photo M	
4-501-008: Photo Y	

Default setting: 5

Range: 0 to 8

The effect of the setting is similar to the Middle ID adjustment in the manual printer gamma adjustment, but the ID ranges outside the central range are also affected slightly.

If the ACC results are not satisfactory, adjust the ACC targets and/or KCMY color balance.

6.4.3 MAIN SCAN DOT POSITION CORRECTION

NOTE: Before adjusting the scanner, adjust the printer registration.

1. Enter the SP mode and open SP4-010 and SP4-011.
2. Check that each value corresponds to the factory-set value.
3. Press the Interrupt key and copy the C-4 chart in the full-color photo mode.

NOTE: Be sure to copy in the photo mode. This is because color displacement cannot be checked properly in text mode .

4. Check the yellow and cyan vertical lines. (Use a Magnification Scope to do this.) If they exactly overwrite the black line at the edges of the copy, exit the SP mode to end the adjustment. If the yellow and cyan lines significantly extend beyond the black line, proceed to the next step.
5. Press the Interrupt key to return to the SP mode and open SP4-932. Compare the current values against the table.

4-932-001	Dot correction R left edge
4-932-002	Dot correction R right edge
4-932-003	Dot correction B left edge
4-932-004	Dot correction B right edge

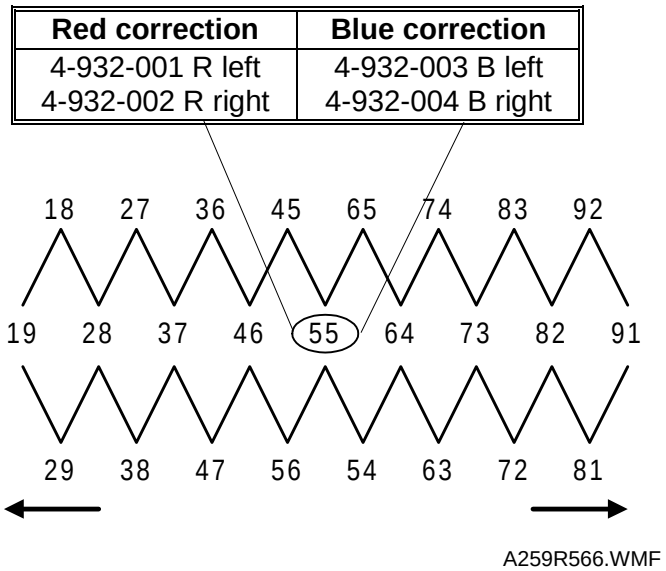
6. Referring to the diagram lower down the page, change the values in accordance with the following rules:

Case 1. When the yellow line is to the left of the black line, and the cyan line is to the right of the black line.

- If the edges of the yellow and cyan lines deviate evenly from the black line, select the value in the middle row that is immediately to the left of the current value.
- If the cyan line's edge is farther from the black line than the yellow line's edge, select the value in the top row that is immediately to the left of the current value.
- If the yellow line's edge is the farther from the black line than the cyan line's edge, select the value in the bottom row that is immediately to the left of the current value.

Case 2. When the cyan line is to the left of the black line, and the yellow line is to the right of the black line.

- If the edges of the yellow and cyan lines deviate evenly from the black line, select the value in the middle row that is immediately to the right of the current value.
- If the cyan line's edge is the farther from the black line than the yellow line's edge, select the value in the top row that is immediately to the right of the current value.
- If the yellow line's edge is the farther from the black line than the cyan line's edge, select the value in the bottom row that is immediately to the right of the current value.



A259R566.WMF

In the above diagram:

- The first digit represents the value of the red correction (4-932-001: R left, 4-932-002: R right)
- The second digit represents the value of the blue correction (4-932-003: B left, 4-932-004: B right)

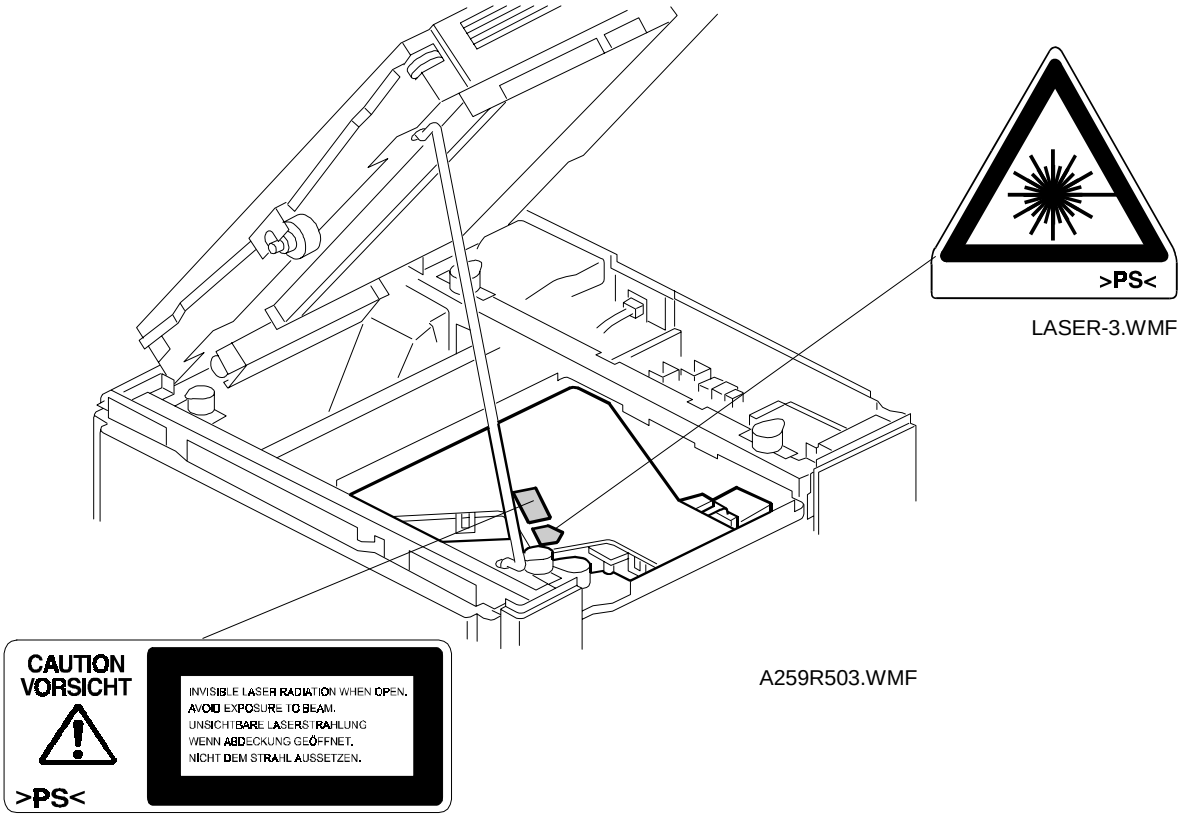
6.5 LASER OPTICS SECTION

⚠WARNING

Turn off the power and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.

CAUTION DECAL LOCATIONS

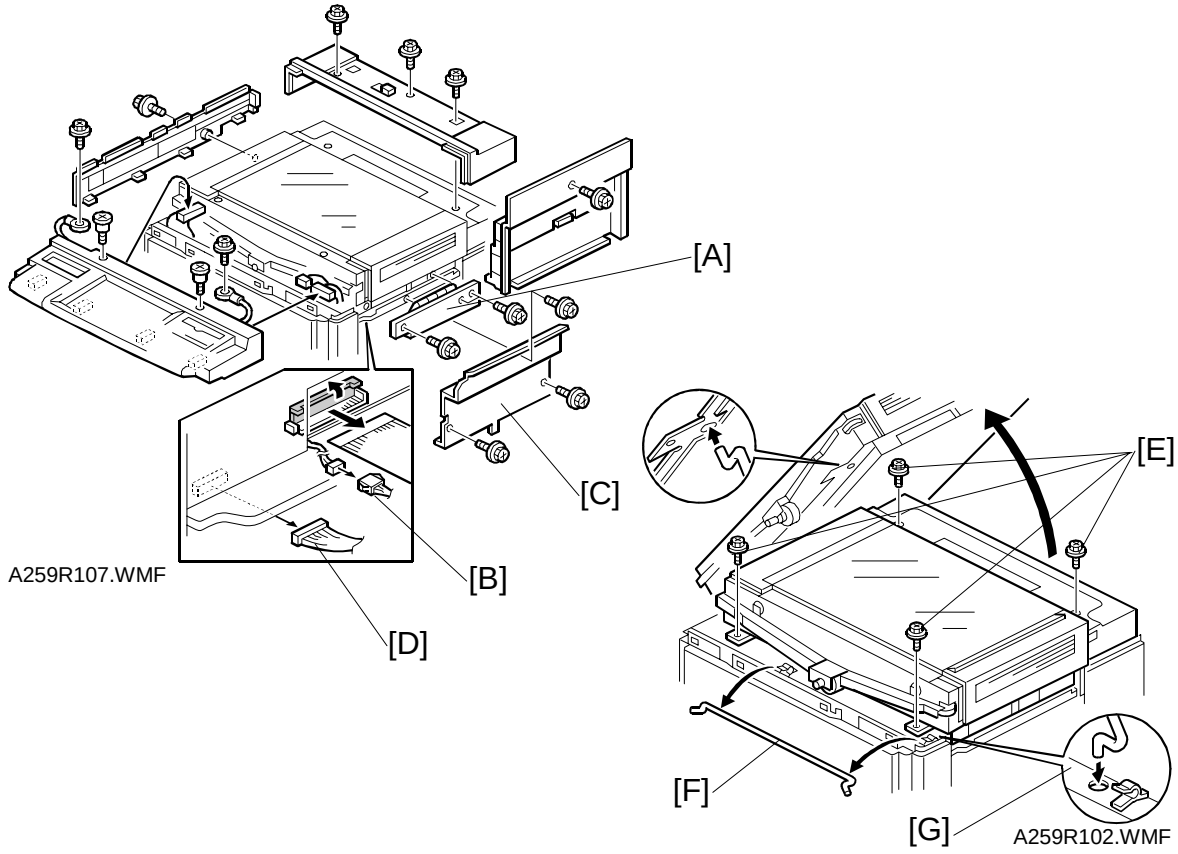
Two caution decals are located in the laser section as shown below.



⚠DANGER

Be sure to turn off the main switch and disconnect the power plug from the power outlet before attempting any disassembly or adjustment of the laser unit. This copier uses a class 3B laser beam with a wavelength of 780 nm and an output of 15 mW. The laser can seriously damage your eyes.

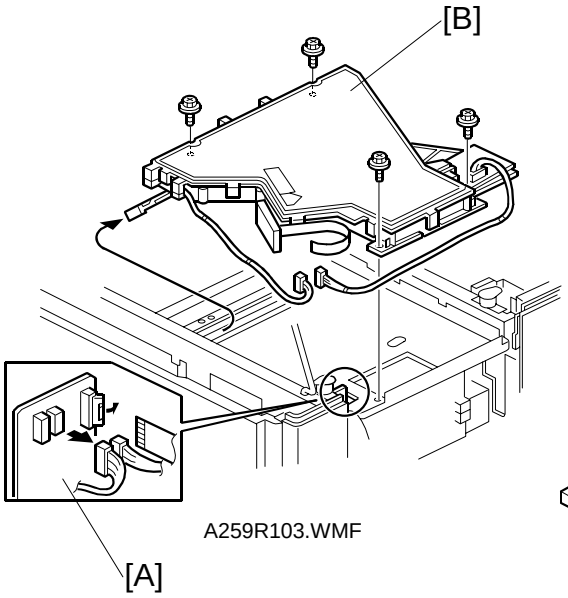
6.5.1 POLYGON MIRROR MOTOR REPLACEMENT



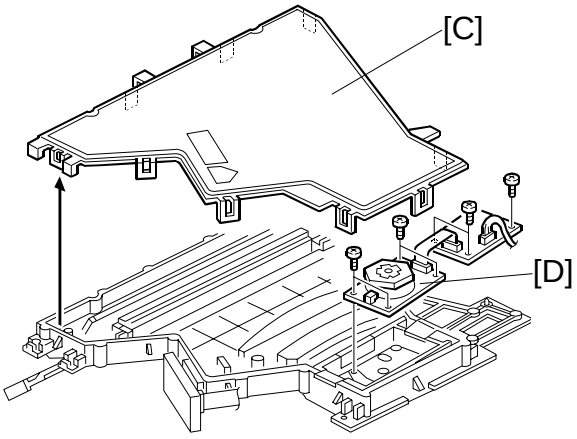
1. Remove the following covers (see "Covers, Fans, and Filters").
   - Right cover (1 screw)
   - Operation panel (A259/A260: 2 screws, 3 connectors, and 2 grounding wires A258: 2 screws, 1 connector, and 1 grounding wire [Europe only])
   - Upper rear cover (3 screws)
   - Upper left cover (1 screw)
2. Remove the IC card cover [A] (3 screws).
3. Disconnect 2 connectors [B].
4. A259/A260 only: Remove the shield cover [C] (3 screws).
5. A260 only: Disconnect connector [D] (CN312).
6. Unscrew the scanner clamp screws [E] (4 screws).
7. Remove the support rod [F].
8. Tilt the scanner and set the support rod as shown [G].

⚠CAUTION

Do not remove the support rod while the scanner unit is tilted.
Disengagement of the support bar may cause the scanner unit to fall down.



A259R103.WMF



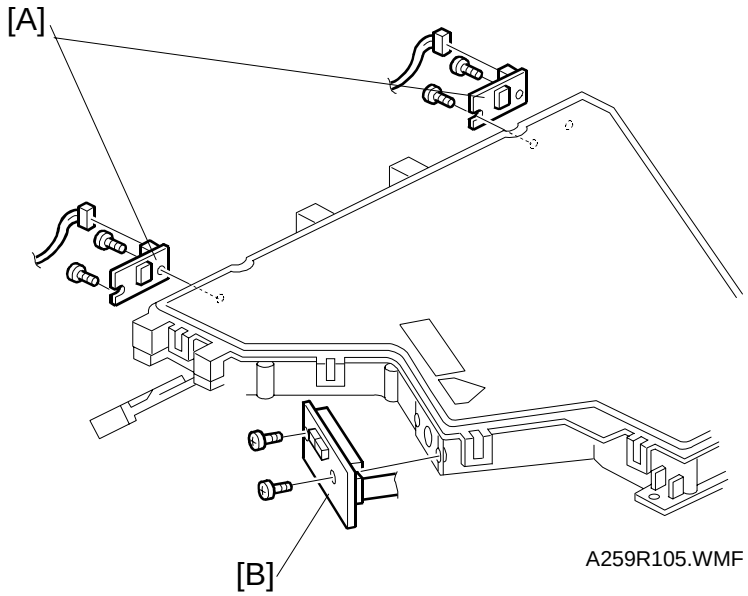
A259R104.WMF

9. Disconnect 3 connectors [A].
10. Remove the optical housing unit [B] (4 screws).
11. Remove the optical housing cover [C] (10 hooks).
12. Remove the polygon mirror motor [D] (4 screws and 1 connector).

⚠CAUTION

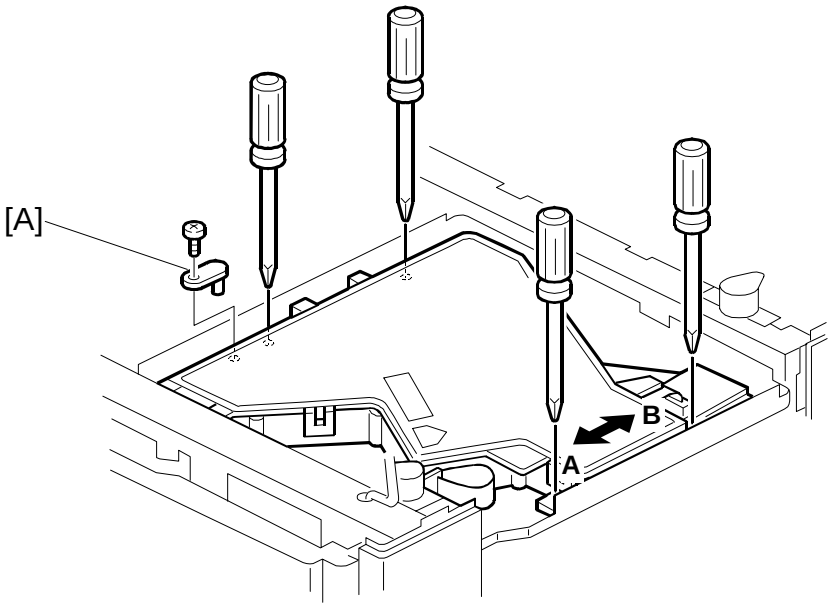
1. **Do NOT attempt to trigger the LD with the optical housing cover open.**
2. **After reassembly, make sure that the optical housing cover is closed completely.**

6.5.2 LASER SYNCHRONIZING DETECTOR BOARD AND LD UNIT REPLACEMENT



1. Remove the optical housing unit (see "Polygon Mirror Motor Replacement").
2. Replace the laser synchronizing detector boards [A] (2 screws and 1 connector each).
3. Replace the LD unit [B] (2 screws and 1 connector).

6.5.3 SQUARENESS ADJUSTMENT

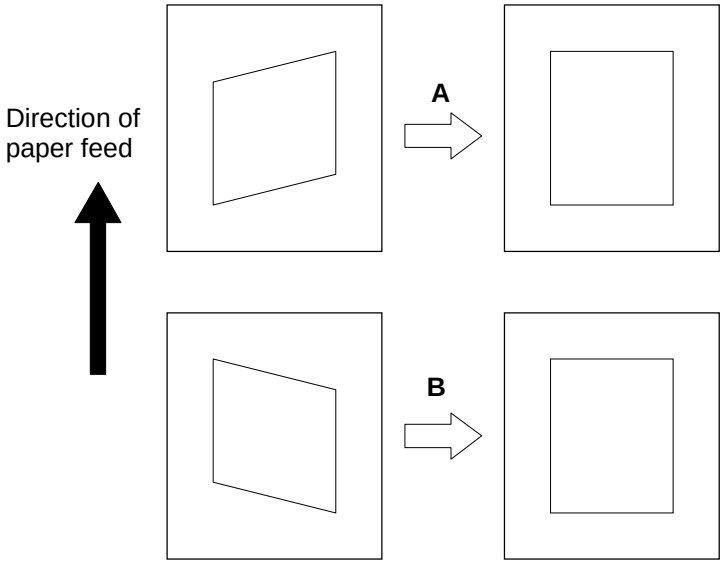


A259R111.WMF

This procedure finely adjusts the image obliqueness caused by the laser unit.

NOTE: This procedure is used to finely adjust the inclination of horizontal lines in the image (across the page) by turning the laser unit, which tilts the scanning line of the laser beam.

1. Print the SP mode test pattern number 1 of SP5-955-018 and measure the inclination of the horizontal lines on the printout in relation to the normal position.
   NOTE: When the laser unit is not squared, lines in the horizontal scanning direction are inclined and lines in the feed direction (vertical lines) stand upright.
2. Loosen the four screws securing the optical housing unit.
3. Remove the pin [A] at the front left side of the optical housing unit.
4. Turn the optical housing unit in the direction of arrow A or arrow B, depending on the inclination of the lines in the horizontal scanning direction you measured (see the diagram on the following page for guidelines).
5. Tighten the screws again (4 screws).



A259R567.WMF

Turning in the direction of arrow A: This tilts horizontal lines in the image clockwise.

Turning in the direction of arrow B: This tilts horizontal lines in the image counterclockwise.

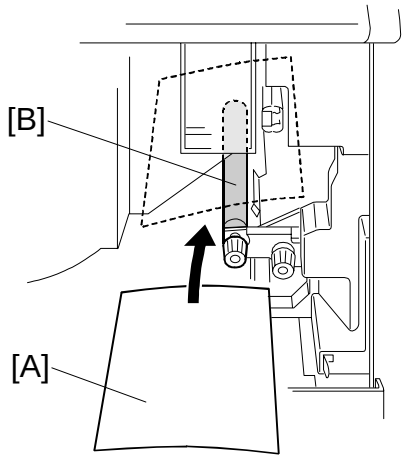
Amount of inclination:
The inclination of horizontal lines on the image is almost equal to the angle by which the scanner unit is turned.

Standard value:
The amount of inclination for a 240 mm scanning line must not be more than 0.5 mm.

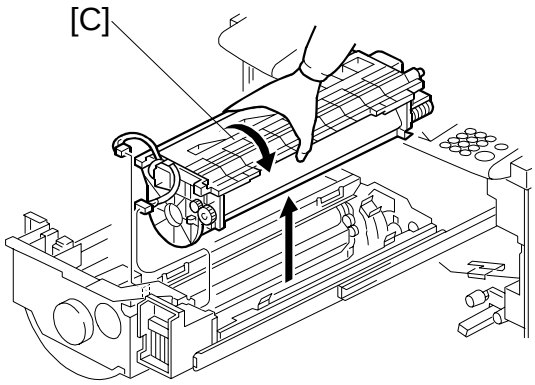
6.6 DEVELOPMENT UNIT

6.6.1 REPLACING THE DEVELOPER

Developer Collection Procedure



A259R215.WMF



A259R204.WMF

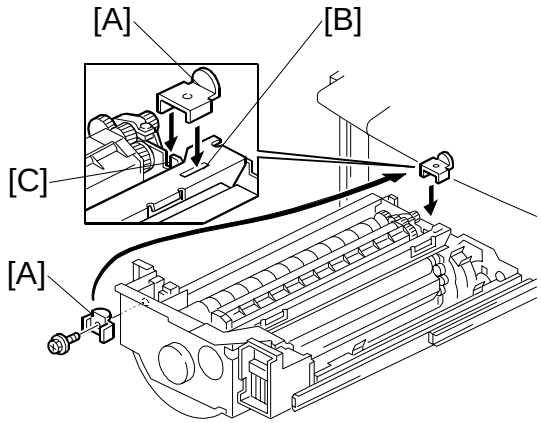
NOTE: Place a protective sheet on the floor. Take care not to spill developer on the customer's floor.

1. Remove the left and right inner covers, transfer belt stay, and charge corona unit, then pull out the drawer unit (2 screws).

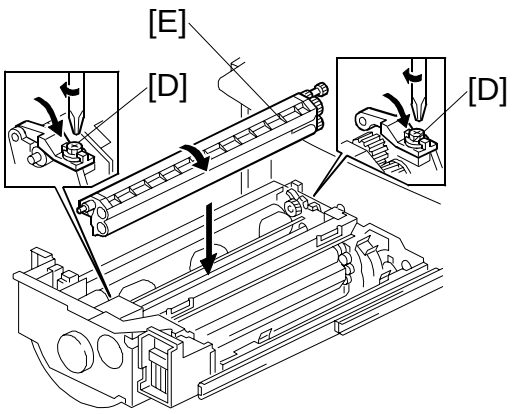
   NOTE: Before drawing out the drawer unit when there is no transfer belt unit, place a sheet of paper [A] on the registration roller [B]. This is required because toner will spill from the rear end of the toner collection coil for the drum onto the registration roller.

2. Remove the drum unit [C] (2 connectors) and cover the drum with paper.

   NOTE: Cover the drum with a sheet of black paper or 5 or more sheets of white paper. Otherwise, the drum will be exposed to light, subjecting the drum to optical fatigue (see "Troubleshooting – Drum Light Fatigue").



A259R301.WMF



A259R302.WMF

3. Remove the left revolver stopper [A] from its storage location on the drawer unit (1 screw) and fit it into the slot [B] at the rear of the revolver side panel and in the notch [C] on the drawer unit stay.

⚠CAUTION

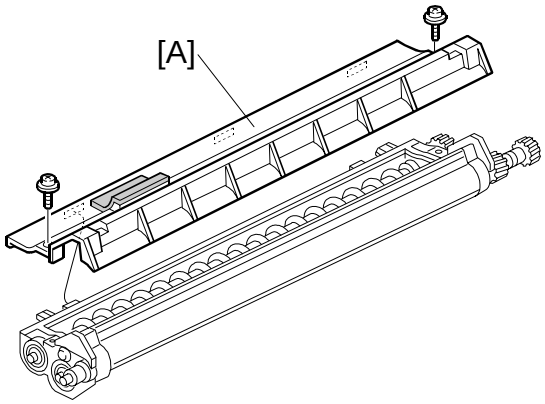
If you do not install the revolver stopper before removing the development unit, the revolver may rotate, causing permanent damage to the development unit or its holder.

4. Open the locks [D] at both ends of the development unit [E] (1 screw each) and remove the development unit [E].

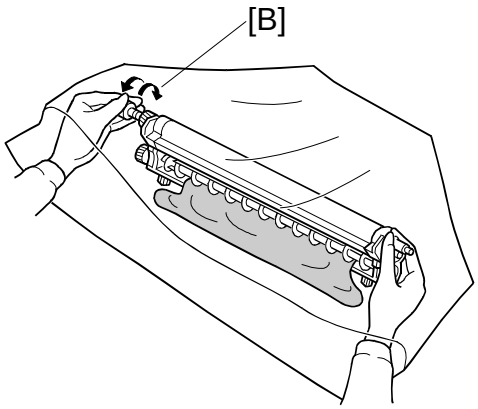
NOTE: When attaching and detaching the development unit, be sure to turn it in the direction shown in the diagram. Turning the development unit in the wrong direction may cause developer to spill from the toner hopper.

⚠CAUTION

Remove the development units one color at a time (never remove two or more development units from the revolver at the same time). Removing two or more development units at the same time may upset the balance of the revolver. This will cause the revolver to revolve by itself, catching, hitting or trapping your fingers inside the unit.



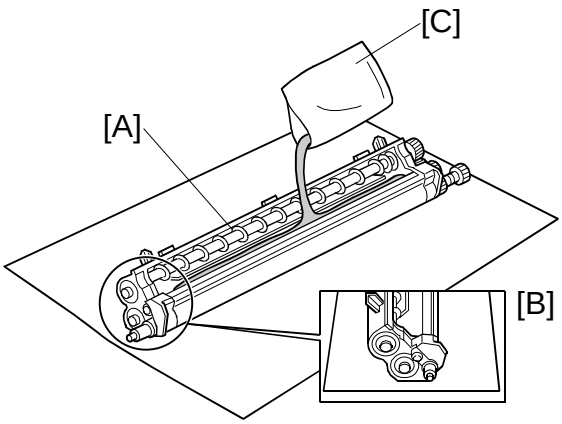
A259R303.WMF



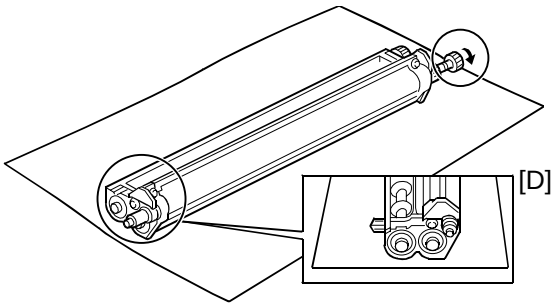
A259R307.WMF

5. Remove the developer cover [A] (2 screws).
6. Hold the development unit upside down in the developer collection bag, then rotate the sleeve in the forward direction [B] to collect the developer.
   NOTE: When rotating the sleeve in the forward direction, keep the sleeve side facing up so that the developer will not be scooped up onto the sleeve.
7. Repeat the forward rotation/collection cycle until developer does not appear on the sleeve.
8. Rotate the sleeve in the opposite direction, then hold the development unit upside down again to collect the developer attached to the sleeve surface.

Installing New Developer



A259R306.WMF

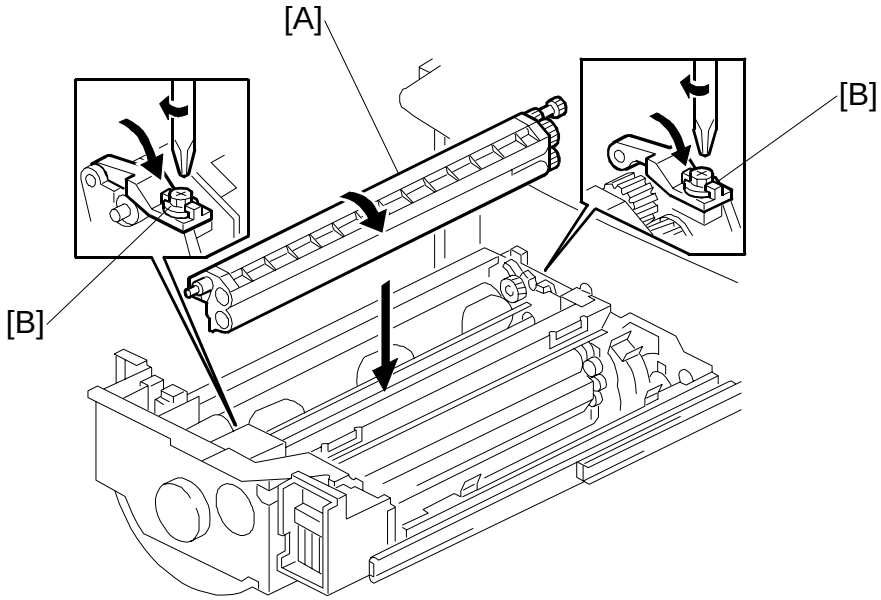


A259R309.WMF

1. Place the development unit [A] in the developer installation position [B] and pour in 1 bag (380 g) of developer [C].
   NOTE: 1) When installing new developer, place the development unit on a flat space.
   2) When pouring developer, fill up the space between the development roller and the first auger first. Then fill up the space between the two augers. This speeds the agitation of the developer and prepares it for use more quickly.
2. Place the development unit in the developer scoop-up position [D]. Check that the developer is not flowing out of the development unit casing while rotating the sleeve in the forward direction.

⚠CAUTION

1. **If the developer is not installed on a flat place, the development unit casing may bend and cause developer to fall when the sleeve is rotated. If this occurs, remove and reinstall the developer.**
2. **Do not rotate the development sleeve in the reverse direction.**

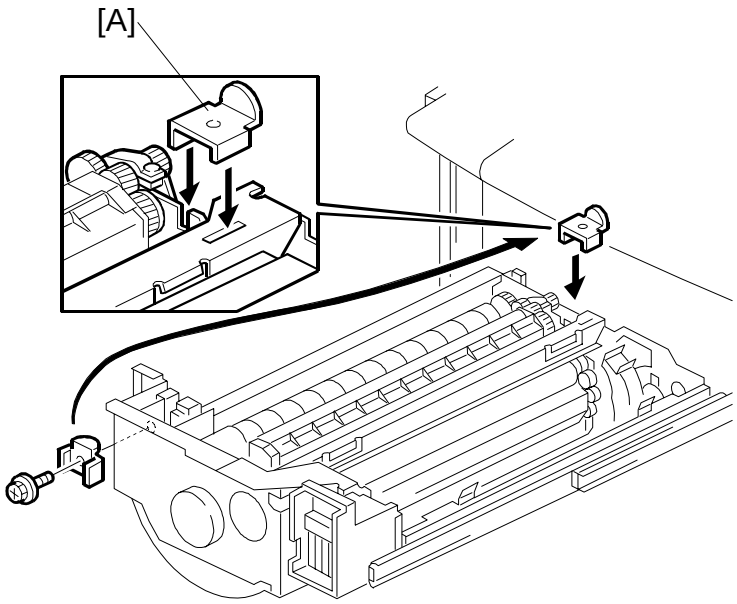


A259R302.WMF

3. Replace the developer cover (2 screws) and put the development unit [A] in the drawer unit (2 lock screws [B]).

⚠CAUTION

1. **When replacing the developer cover and development unit, do not apply excessive force to the center of the development unit. The doctor gap will bend, altering the developer scooping efficiency.**
2. **When replacing the developer cover, first press both ends of the cover to confirm that the cover is properly set, and then secure it with the screws. If the ends of the cover are not properly set, developer may fall from the gap.**
3. **When installing the development unit in the drawer unit, hold the front and rear end of the development unit. Holding the center of the development unit may cause the development unit casing to bend, and developer may spill. If this occurs, remove then reinstall the developer.**
4. **Make sure that the developer locks (forward and rear) are secured with screws before rotating the revolver. This protects the developer assembly and locks from damage.**
5. **Tighten the developer lock screws firmly. Loose lock screws will cause the PG (Photoconductor Gap) to fluctuate.**



A259R301.WMF

4. Remove the revolver stopper [A], rotate the revolver to the next color, then follow the developer installation procedure from step 1.

NOTE: The revolver unit rotates counterclockwise. Do NOT try to turn it in the other direction.

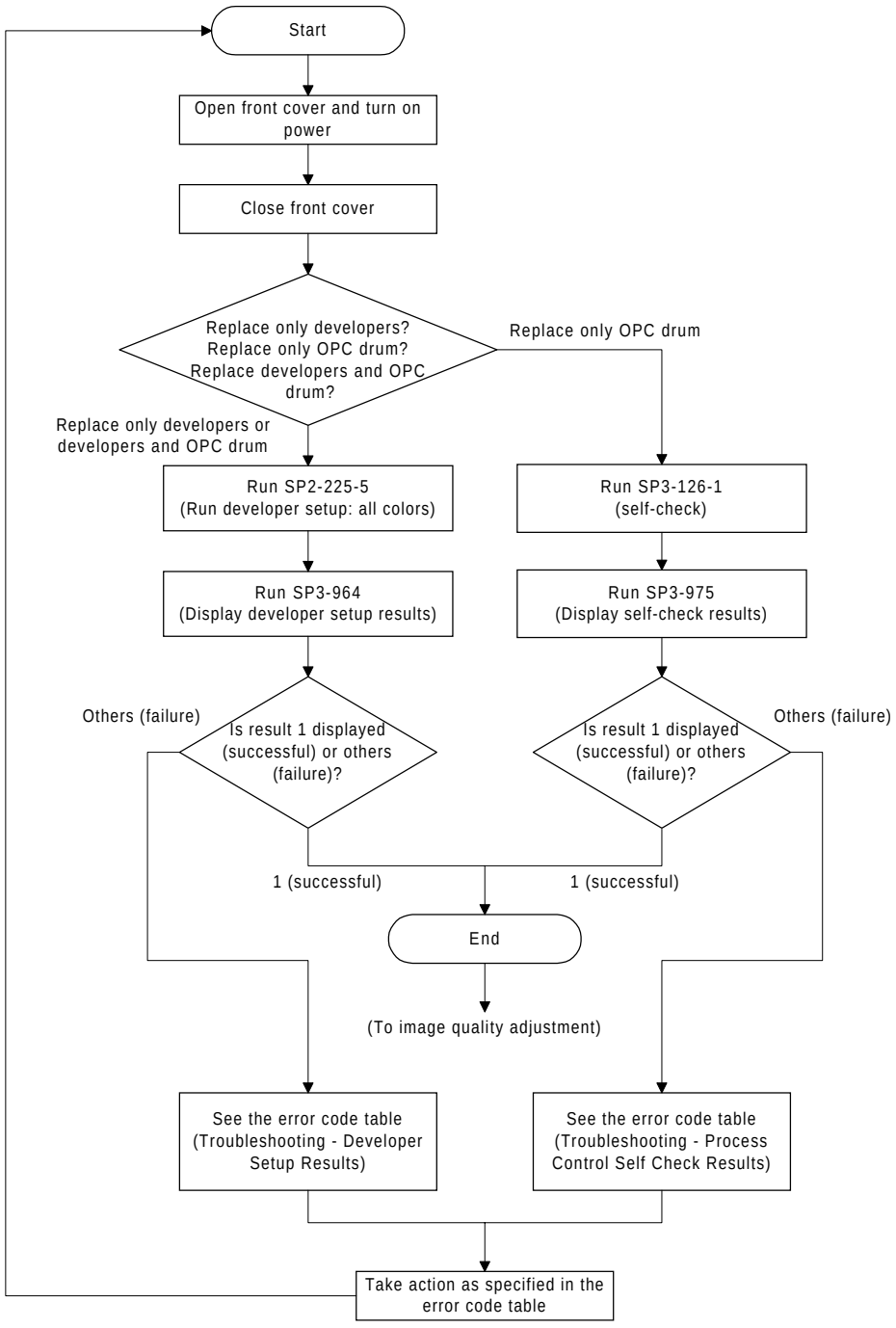
⚠CAUTION

If you do not install the revolver stopper before removing the development unit, the revolver may rotate, causing permanent damage to the development unit or its holder.

6.6.2 POST DEVELOPER COLLECTION PROCEDURE

Follow the procedure in the flow chart shown below during the post developer collection procedure.

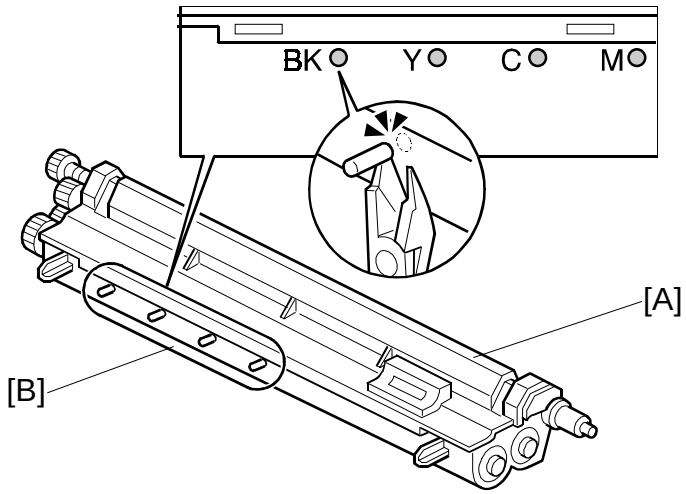
Also use this flowchart after replacing the drum.


Start
Open front cover and turn on power
Close front cover
Replace only developers?
Replace only OPC drum?
Replace developers and OPC drum?
Replace only OPC drum
Replace only developers or developers and OPC drum
Run SP2-225-5
(Run developer setup: all colors)
Run SP3-126-1
(self-check)
Run SP3-964
(Display developer setup results)
Run SP3-975
(Display self-check results)
Others (failure)
Is result 1 displayed (successful) or others (failure)?
Others (failure)
Is result 1 displayed (successful) or others (failure)?
1 (successful)
1 (successful)
End
(To image quality adjustment)
See the error code table (Troubleshooting - Developer Setup Results)
See the error code table (Troubleshooting - Process Control Self Check Results)
Take action as specified in the error code table

A259R560.WMF

After the end, adjust the image quality. (Do the user mode ACC procedure. If necessary adjust the ACC targets and/or the KCMY color balance.)

6.6.3 DEVELOPMENT UNIT REPLACEMENT



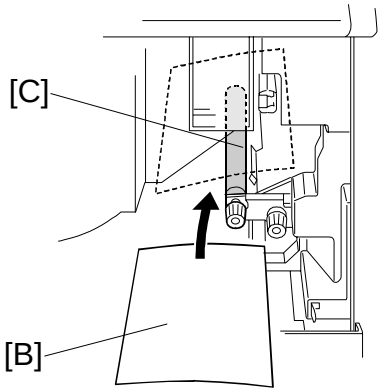
A259R308.WMF

The development unit [A] service part is the same for each of the KYCM colors. Each unit has four pins.

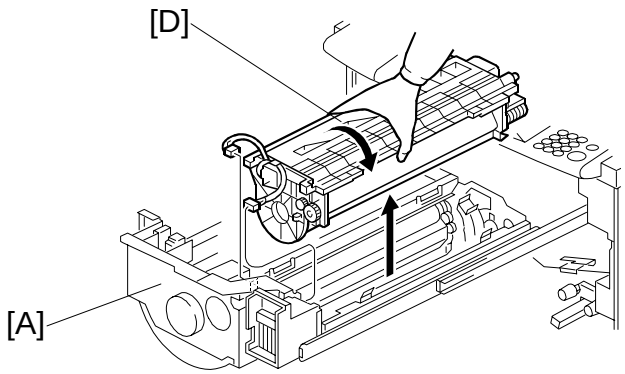
When replacing a development unit, cut off one of the pins [B].

For example, when installing a new development unit for black, cut off the pin marked Bk.

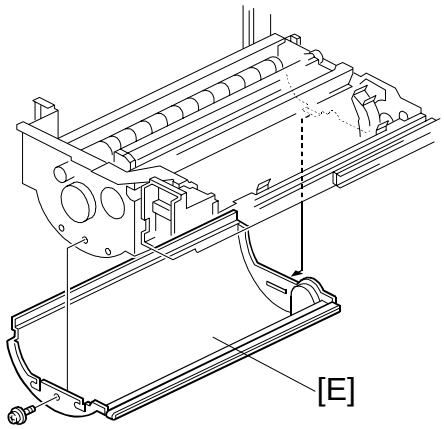
6.6.4 TONER COLLECTION TRAY CLEANING



A259R215.WMF



A259R204.WMF



A259R305.WMF

NOTE: Place a protective sheet on the floor. Take care not to spill developer on the customer's floor.

1. Remove the left and right inner covers, transfer belt stay, and charge corona unit, then pull out the drawer unit [A] (2 screws).

   NOTE: Before drawing out the drawer unit when the transfer belt unit has been removed, place a sheet of paper [B] on the registration roller [C]. This is required because toner will spill from the rear end of the toner collection coil from the drumonto the registration roller.

2. Remove the drum unit [D] (2 connectors) and cover the drum with paper.

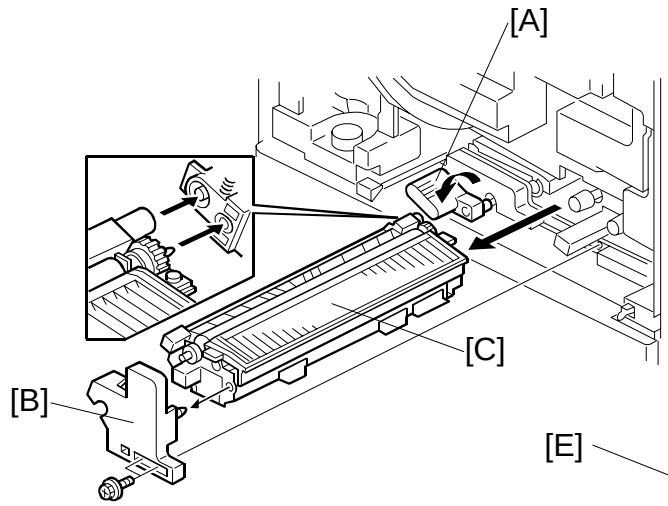
   NOTE: Cover the drum with a sheet of black paper or 5 or more sheets of white paper. Otherwise, the drum will be exposed to light, subjecting it drum to optical fatigue (see "Troubleshooting – Drum Light Fatigue").

3. Remove the toner collection tray [E] (2 screws) and clean it.

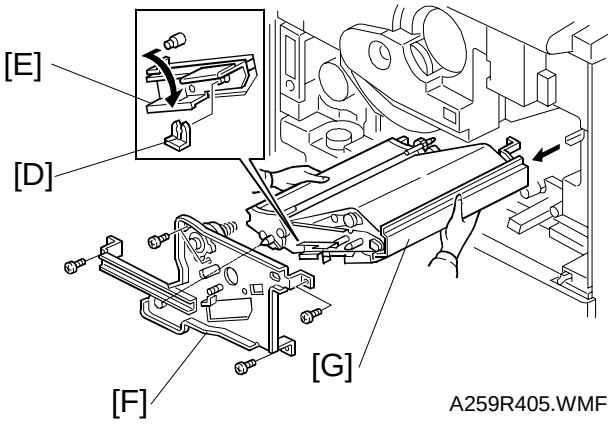
6.7 TRANSFER BELT UNIT

6.7.1 TRANSFER BELT SECTION

Transfer Belt and Cleaning Unit



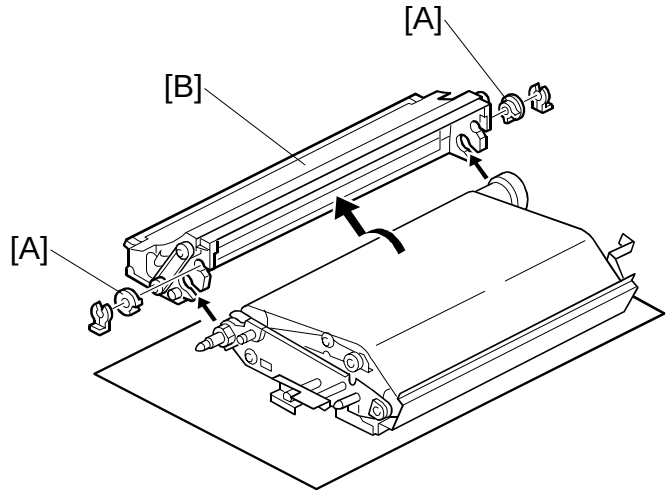
A259R401.WMF



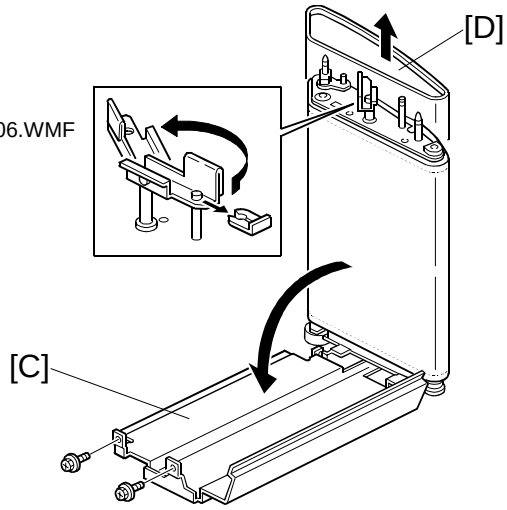
A259R405.WMF

NOTE: Take care not to get the customer site dirty. Put down a floor mat before removing the cleaning unit.

1. Remove the right inner cover (2 screws).
2. Turn the transport release lever [A].
3. Remove the paper transfer unit positioning stay [B] (2 screws) and pull out the paper transfer unit [C].
4. Remove the snap ring [D] and set the belt tension release lever to the "Transfer Belt Unit Install/Uninstall [E]". Then put the snap ring back on.
5. Remove the transfer belt stay [F] (5 screws) and pull out the transfer belt unit [G].



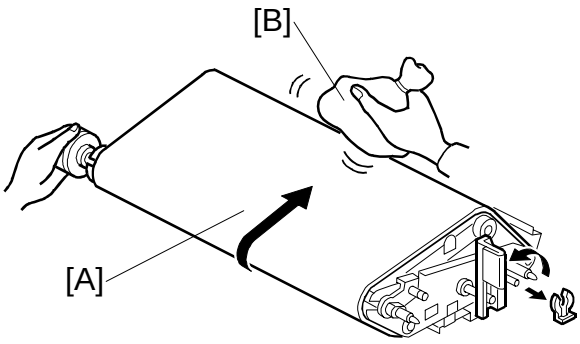
A259R406.WMF



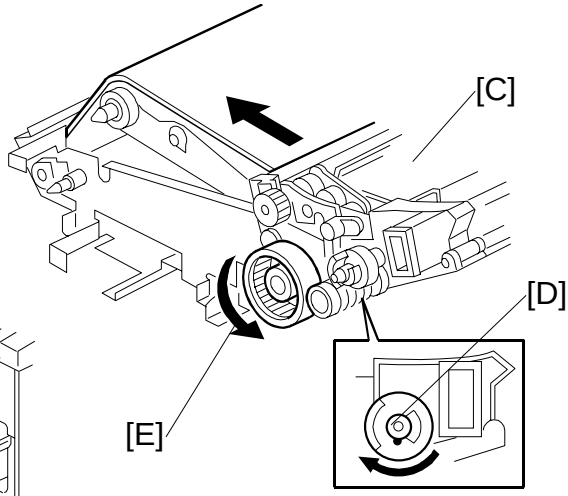
A259R407.WMF

6. Remove the cleaning unit retainers [A] from the cleaning unit (2 snap rings) and remove the cleaning unit [B].
7. Lift up the belt unit and detach the upper part of the transfer belt bracket (2 screws). Lower the bracket [C], as shown.
8. Turn the belt tension release lever in the direction shown, to set it to the "Transfer Belt Replacement" position.
9. Pull and turn the transfer belt [D], to remove it.

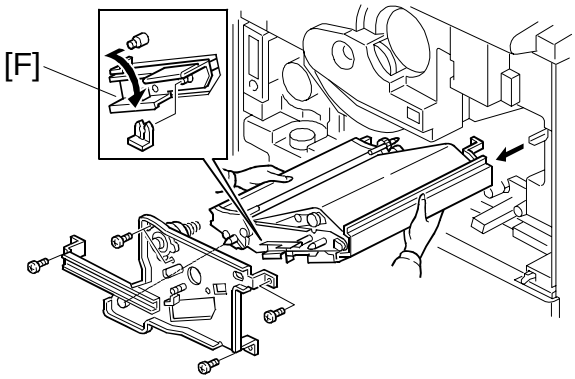
NOTE: 1) Hold the transfer belt at its edge. Never touch the belt surface. Any dirt on the belt might cause poor copy quality.
2) After removing the transfer belt, clean each roller with water or alcohol. When using alcohol, set the rollers aside for about 10 minutes to dry. If alcohol remains on the rollers when the belt is replaced, the rollers may adhere to the belt.



A259R416.WMF



A259R417.WMF



A259R405.WMF

10. Replace the transfer belt and reset the transfer belt bracket.
    NOTE: When installing a new transfer belt, make sure that the belt rims at both ends are past the ends of the roller.
11. Turn the transfer belt release lever in the direction shown above [A], and apply setting powder [B] to the entire belt surface, before putting back the cleaning unit [C].
12. Attach the cleaning unit to the transfer belt unit and turn the joint section of the cleaning unit [D] in the direction shown above, to pressurize the blade.
13. After pressurizing the blade, rotate the belt one turn in the direction shown above [E] to orient the belt with the blade.

NOTE: Failure to execute steps 11 to 13 may cause the belt to catch on the blade. This will cause the LCD to display SC452 (transfer belt home position detection error) or the blade bracket may become bent.

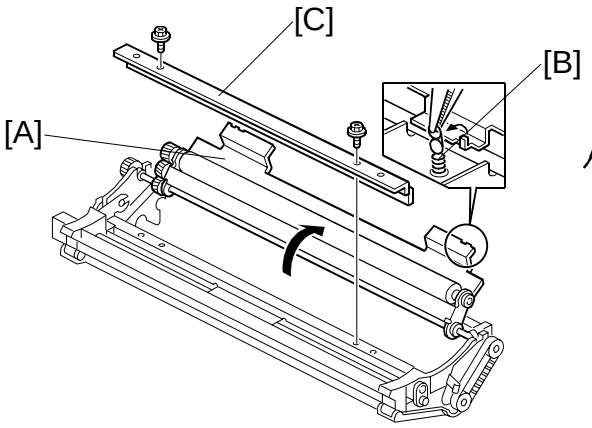
14. Set the belt tension release lever to the "Transfer Belt Release Position [F]" and reinstall the transfer belt unit.

Hint for reinstalling the transfer belt unit.

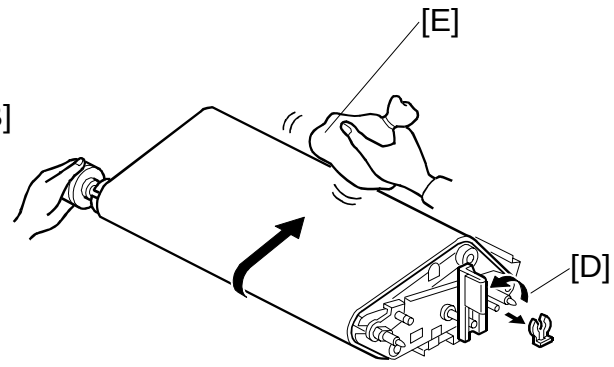
When installing the transfer belt unit, hold it up with one hand underneath at the rear and slide it in along the rails. If it is not held up, it will not engage the coupling gears properly.

Cleaning Blade Replacement

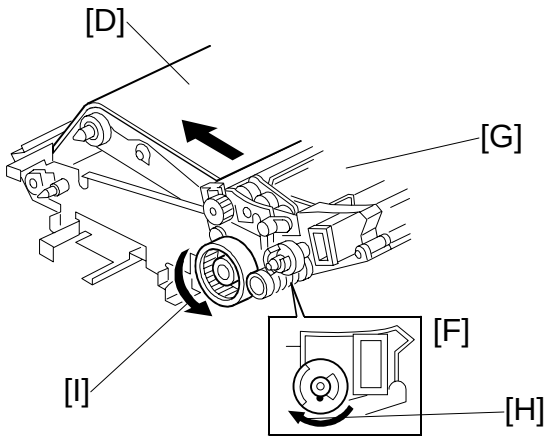
NOTE: Take care not to get the customer site dirty. Put down a floor mat before removing the cleaning unit.



A259R412.WMF



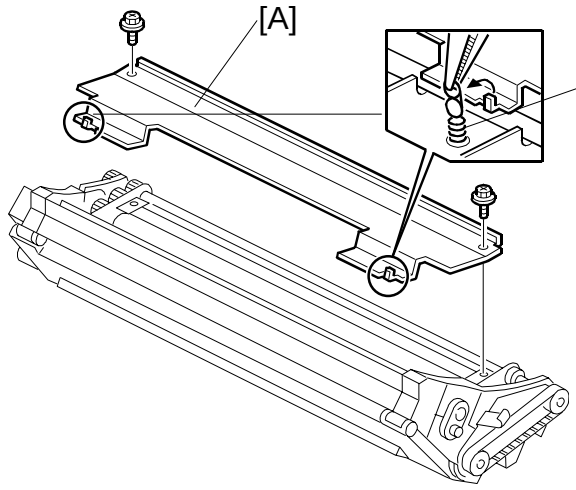
A259R416.WMF



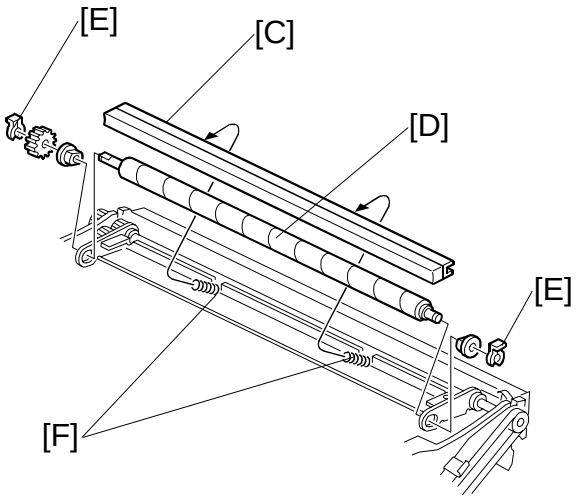
A259R417.WMF

1. Turn the lubricant bracket [A] as shown (unhook 2 springs [B] at both ends).
2. Remove the blade [C] (2 screws).
   NOTE: Do not touch the rubber area of the blade.
3. After replacing the blade, turn the transfer belt release lever [D] in the direction shown, and apply setting powder [E] to the entire belt surface, before installing the cleaning unit.
4. Attach the cleaning unit to the transfer belt unit and turn the joint section [F] of the cleaning unit [G] in the direction shown above [H], to pressurize the blade.
5. After pressurizing the blade, rotate the belt one turn in the direction shown above [I], to orient the belt with the blade.
   NOTE: Failure to execute steps 3 to 5 may cause the belt to catch on the blade. This will cause the LCD to display SC452 (transfer belt home position detection error) or the blade bracket may become bent.

Lubricant Bar and Lubricant Brush Replacement



A259R413.WMF



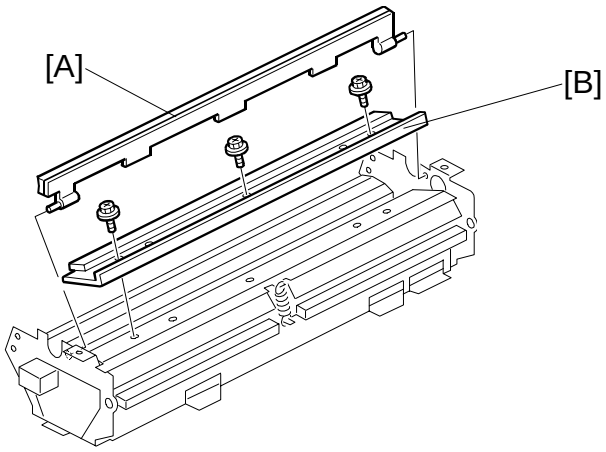
A259R414.WMF

1. Remove the lubricant bracket [A] (2 screws and 2 springs [B]).
2. Remove the lubricant bar [C].
3. Remove the lubricant brush [D] (2 snap-rings [E], 2 bearings, and 1 gear).

NOTE: When reinstalling the lubricant bar, make sure that the springs [F] are set properly.

6.7.2 PAPER TRANSFER UNIT

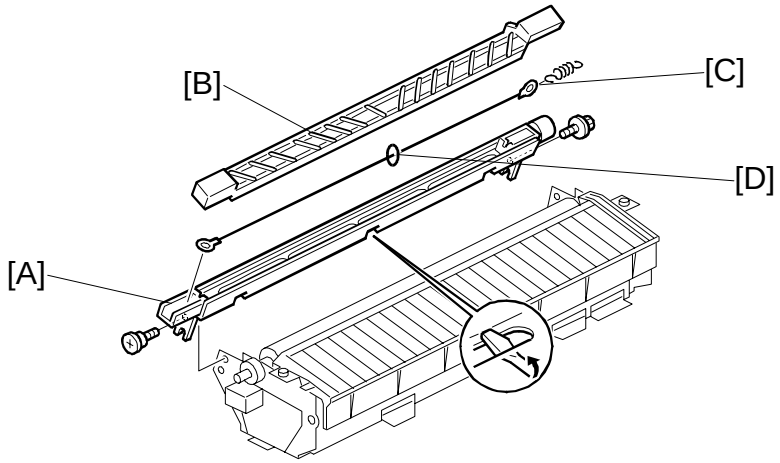
Lubricant Bar And Blade Replacement



A259R403.WMF

1. Remove the paper transfer guide plate (2 screws).
2. Remove the lubricant bar [A].
3. Remove the blade [B] (3 screws).

Paper Separation Corona Wire Replacement

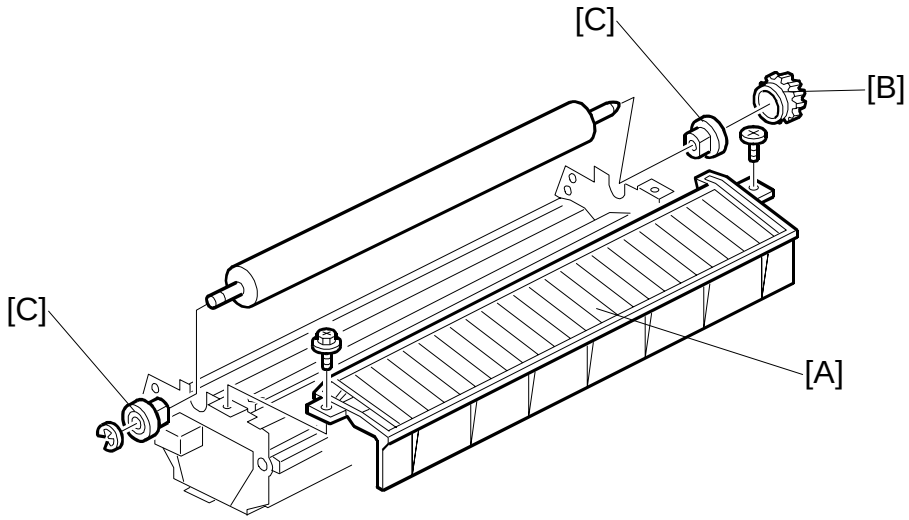


A259R404.WMF

1. Remove the paper separation corona unit [A] (2 screws).
2. Remove the paper separation corona guide [B].
3. Remove the corona wire [C] (1 spring).

NOTE: 1) When reinstalling the corona wire, make sure to reinstall the ring [D] in the middle of the corona wire.
2) Make sure the corona wire is properly set in place in the V-shaped notch at the rear.

Transfer Roller Replacement

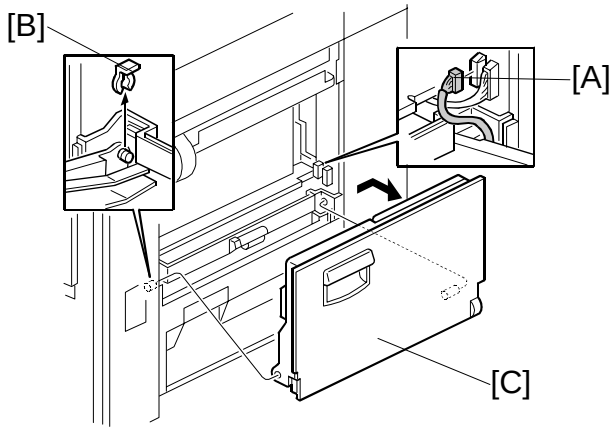


A259R402.WMF

1. Remove the paper transfer guide plate [A] (2 screws).
2. Remove the drive gear [B].
3. Remove the front and rear bearings [C] (1 E-ring).

6.8 PAPER FEED AND REGISTRATION SECTION

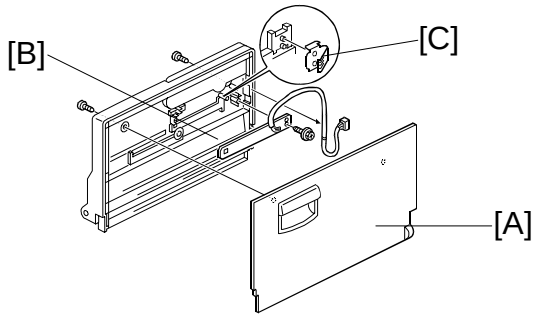
6.8.1 BY-PASS FEED TABLE REMOVAL



A259R701.WMF

1. Remove the right cover (see "Covers, Fans, and Filters").
2. Disconnect the connector [A].
3. Remove the front snap ring [B].
4. Tilt the by-pass feed table [C] by about 20 degrees, then remove it by pushing it toward the rear.

6.8.2 BY-PASS PAPER WIDTH DETECTION BOARD REPLACEMENT

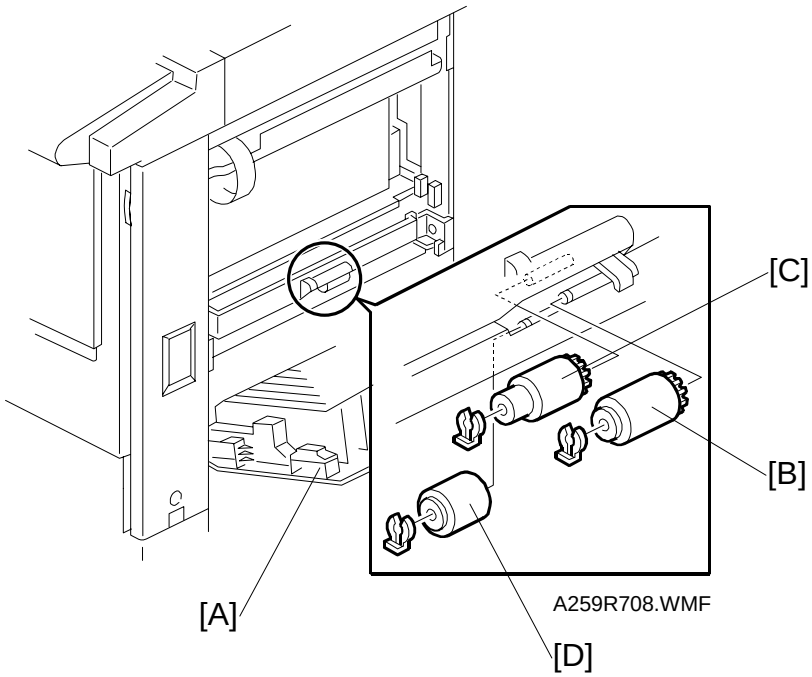


A259R702.WMF

1. Remove the by-pass feed table.
2. Remove the by-pass feed cover [A] (2 screws).
3. Remove the by-pass feed paper width detection board [B] (1 screw).

NOTE: When installing the board, take care not to bend the terminal plate [C].

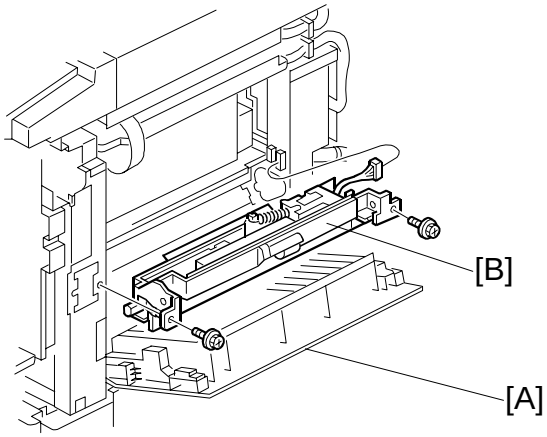
6.8.3 BY-PASS FEED, PICK-UP AND SEPARATION ROLLERS, AND TORQUE LIMITER REPLACEMENT



1. Remove the by-pass feed table.
2. Open the vertical transport door [A].
3. Remove the snap rings and replace the rollers.

NOTE: Clean the pick-up [B], feed [C], and separation rollers [D] with a moistened cloth.

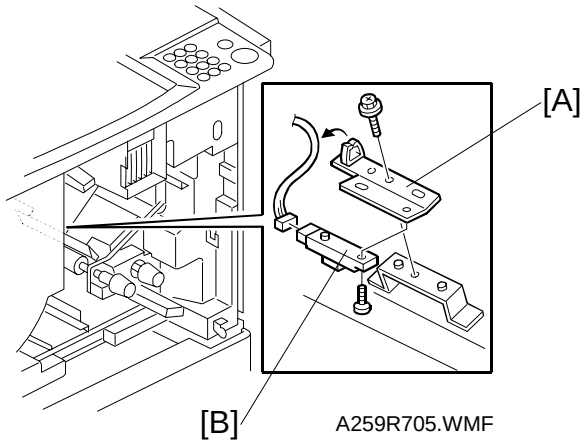
6.8.4 BY-PASS FEED UNIT REPLACEMENT



A259R703.WMF

1. Remove the following covers (see "Covers, Fans, and Filters"):
   - Right front cover
   - Right cover
   - Right rear cover
2. Open the vertical transport door [A].
3. Remove the by-pass feed table (1 connector, 1 snap ring).
4. Remove the by-pass feed unit [B] (2 screws and 1 connector).

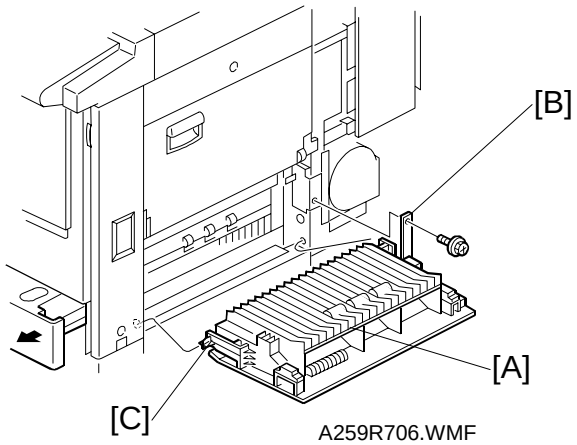
6.8.5 REGISTRATION SENSOR REPLACEMENT



A259R705.WMF

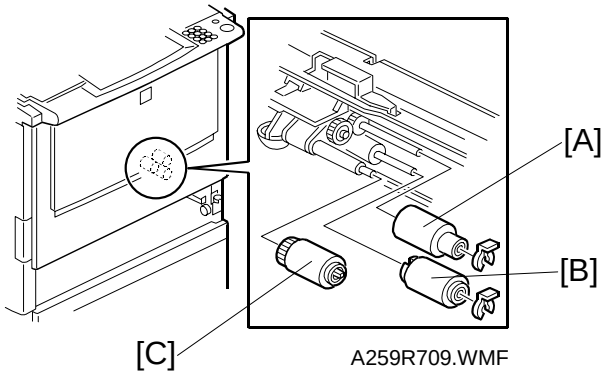
1. Remove the transfer belt unit.
2. Remove the registration sensor bracket [A] (1 screw).
3. Remove the registration sensor [B] (1 screw and 1 connector).

6.8.6 VERTICAL TRANSPORT DOOR REPLACEMENT



1. Open the vertical transport door [A].
2. Remove the bracket [B] (1 screw).
3. Push in hinge [C], and remove the vertical transport door.

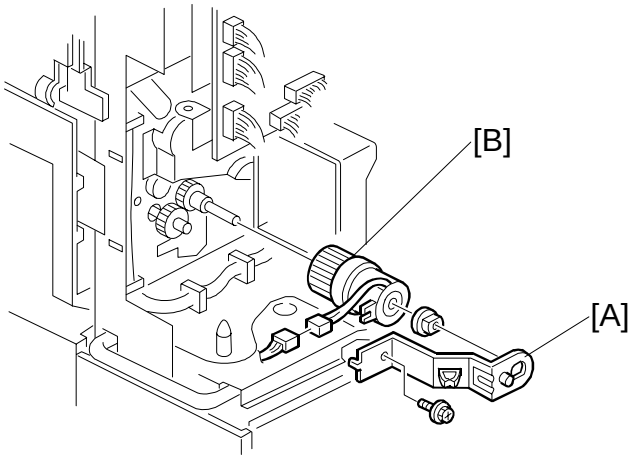
6.8.7 PAPER TRAY PICK-UP, PAPER FEED, AND SEPARATION ROLLER REPLACEMENT



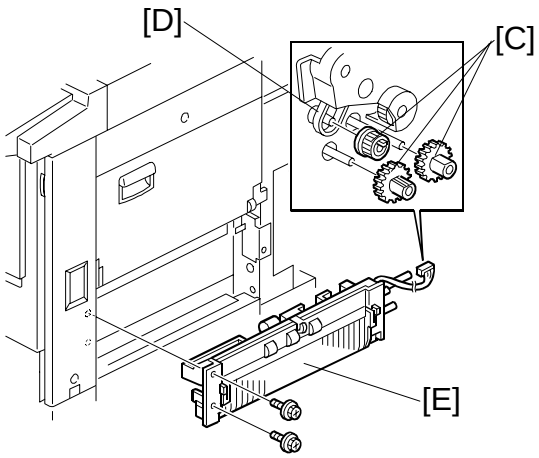
1. Remove the paper tray.
2. Remove the paper feed roller [A] (1 snap ring), separation roller [B] (1 snap ring), and pick-up roller [C].

NOTE: Clean the pick-up, feed, and separation rollers with a moistened cloth.

6.8.8 PAPER FEED UNIT AND CLUTCH REPLACEMENT



A259R712.WMF



A259R707.WMF

1. Remove the following covers (see "Covers, Fans, and Filters"):
   1) Used toner cover
   2) Rear cover
   3) Right rear cover
2. Remove the vertical transport door.
3. Remove the main exhaust fan.
4. Remove the paper feed clutch bracket [A] (1 screw).
5. Remove the paper feed clutch [B] (1 bearing and 1 connector).
6. Remove the three paper feed unit drive gears [C] (1 drive belt [D]).
7. Remove the paper feed unit [E] (2 screws and 1 connector).

6.8.9 COPY IMAGE AREA ADJUSTMENT

Adjust the leading edge registration for each paper type and line speed (normal paper, OHP, thick paper, 2/3 speeds) to determine the leading edge margin. Also adjust the side to side registration for each paper feed station, to determine the left and right edge margins.

NOTE: When adjusting the leading edge registration, be sure the machine has been connected to the power outlet for more than 3 hours.

The leading edge margin should be 5 ± 2 mm. The adjustment procedure is described below.

Preparation

1. Place the type of paper for the registration adjustment in the paper feed tray.
2. Enter SP mode and ensure that all the values of SP2-101 are 0.0 (default value).
3. Generate the trim patterns using the procedure shown below.
   1) Select SP5-955-018 (Printer in Pattern).
   2) Press "1" in "Data Input" on the screen at the ten-key pad and press # (Enter key). "1" appears in the "Set Data" field.
   3) Press the Interrupt key to temporarily exit the SP mode screen, select "B/W Mode" and the paper feed tray for the test, then press the Start key to generate the trim pattern.
   4) Press the Interrupt key again to return to the SP mode screen.

Leading Edge Registration

Standard value: 5 ± 2 mm

1. Enter SP mode 1-1 (leading edge registration adjustment).
2. Select the level 3 SP mode for the condition you wish to adjust.
   - 1. Normal (wooden pulp paper)
   - 2. OHP
   - 3. Thick paper
   - 4. 2/3 speed (printer mode)
3. Type a number in "Data Input" on the screen at the ten-key pad.

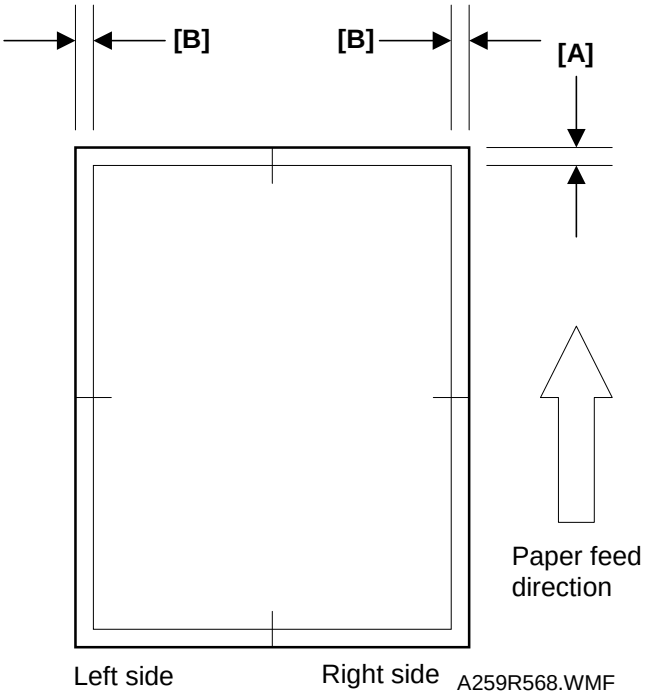
   Input value range: -5.0 to 5.0

   After entering a number, press the # (Enter key) to save the number in "Set Data."

   To increase the leading edge margin [A]: Increase the stored value.

   To decrease the leading edge margin: Reduce the stored value.

   NOTE: To enter a negative number, press the ⊙/* key before typing the value of the negative number.
4. Repeat printing and testing with the interrupt key until the margin [A] in the trim pattern falls within the specified range.



Side-to-side Registration

Standard value: 2 ± 2 mm

1. Enter SP mode 1-2 (side-to-side registration adjustment).
2. Select the paper feed unit to test.
   - Manual feed (by-pass feed table)
   - Tray 1 (Copier paper feed tray): A258 only
   - Tray 2 (Optional paper feed unit, first tray)
   - Tray 3 (Optional paper feed unit, second tray)
   - Tray 4 (Optional paper feed unit, third tray)
   - Duplex 2nd side (Duplex unit): A259/A260 only

   NOTE: Any value entered for Tray 1 is ignored in duplex models.

3. Type a number in "Data Input" on the screen at the ten-key pad.

   Input value range: -5.0 to 5.0

   After entering a number, press the # (Enter key) to save the number in "Set Data."

   To move the image to the right (when viewing towards the direction of paper feed): Increase the stored value.

   To move the image to the left (when viewing towards the direction of paper feed): Decrease the stored value.

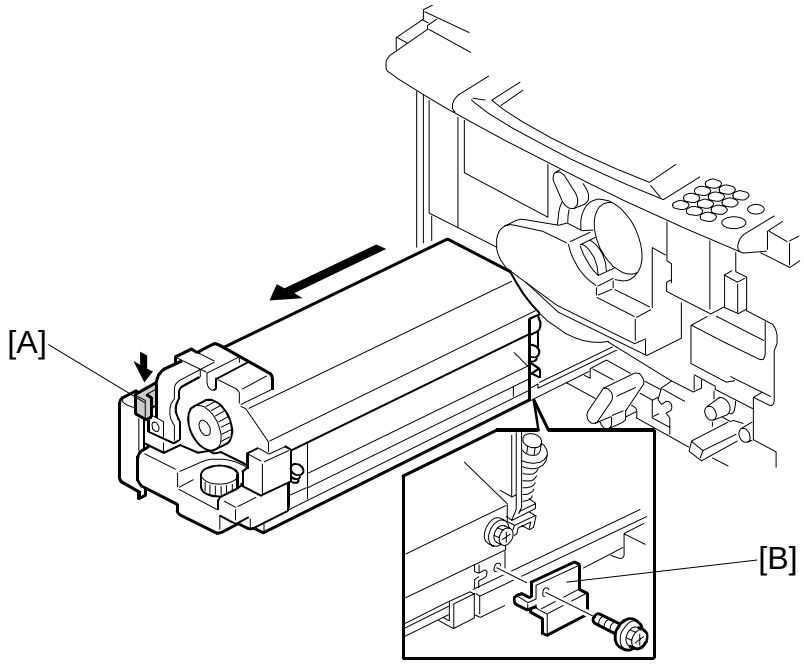
   NOTE: To enter a negative number, press the ⊙/× key before typing the value of the negative number.

4. Repeat step 3) until the distance [B] in the trim pattern (see the previous page) falls within the specified range.

NOTE: After the registration adjustment, reset the value of SP5-955-18 to "0" to resume normal copy operation.

6.9 PAPER TRANSPORT, FUSING, AND PAPER EXIT SECTIONS

6.9.1 FUSING UNIT REMOVAL



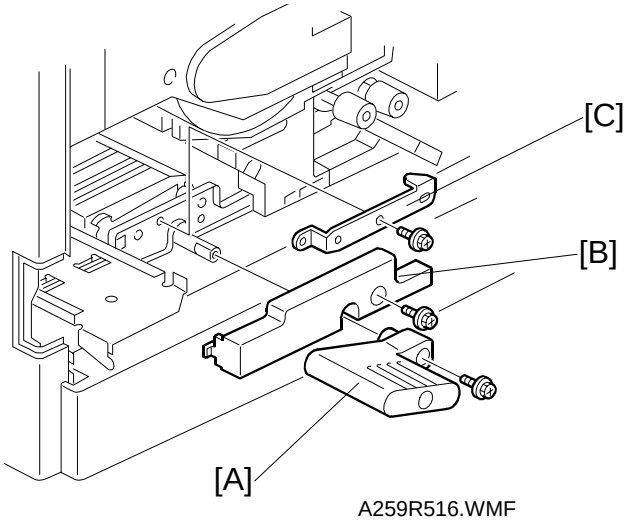
A259R514.WMF

⚠CAUTION

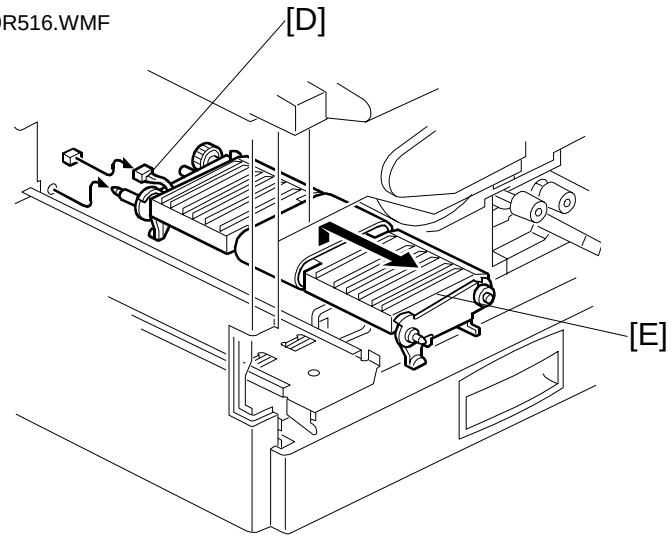
1. **Be careful when handling the fusing unit. It is very hot.**
2. **Take care not to spill silicone oil on the floor. If silicone oil spills on the floor, immediately clean it up with a suitable solvent. Silicone oil is very slippery and can cause someone to fall.**

1. Remove the front door (see “Covers, Fans, and Filters”).
2. Lower the release lever [A], pull out the fusing unit, and unscrew the stopper [B] (1 screw).
   NOTE: Hold the bottom of the fusing unit when you pull it out.

6.9.2 TRANSPORT UNIT REMOVAL



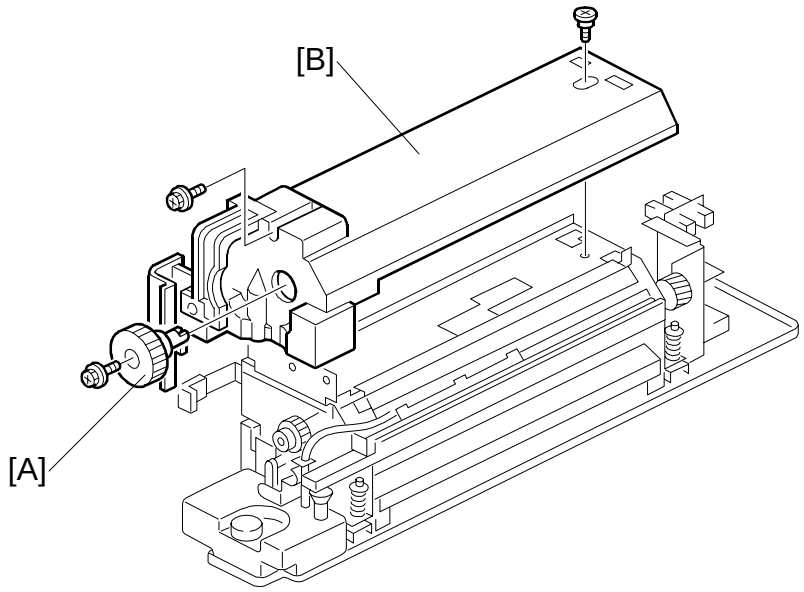
A259R516.WMF



A259R517.WMF

1. Remove the fusing unit.
2. Remove the transport unit lever [A] (1 screw).
3. Remove the inner cover [B] (1 screw).
4. Remove the mounting bracket [C] (1 screw).
5. Unplug the connector [D] and remove the transport unit [E].

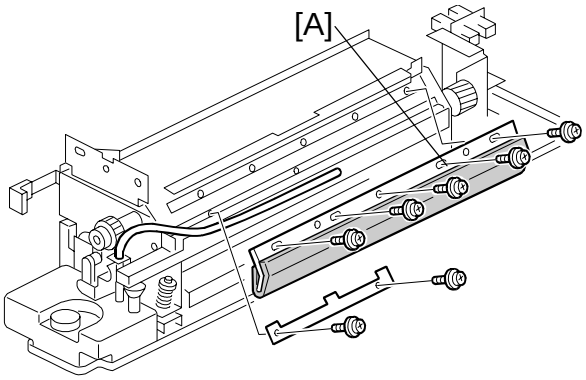
6.9.3 FUSING UNIT TOP COVER REMOVAL



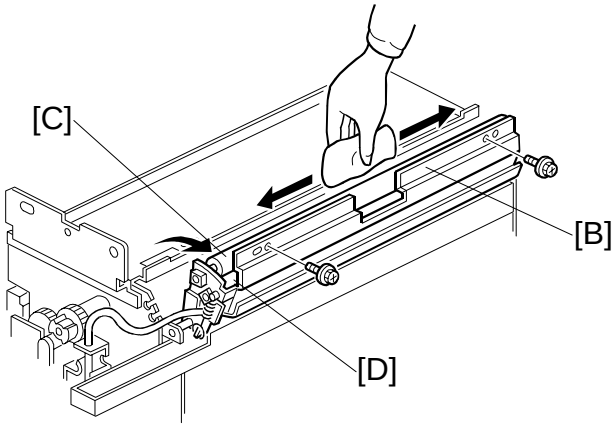
A259R606.WMF

1. Remove the fusing unit knob [A] (1 screw).
2. Remove the fusing unit top cover [B] (2 screws).

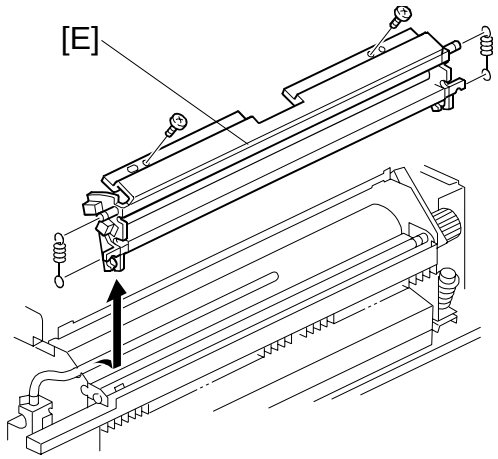
6.9.4 OIL SUPPLY PAD AND OIL BLADE REPLACEMENT



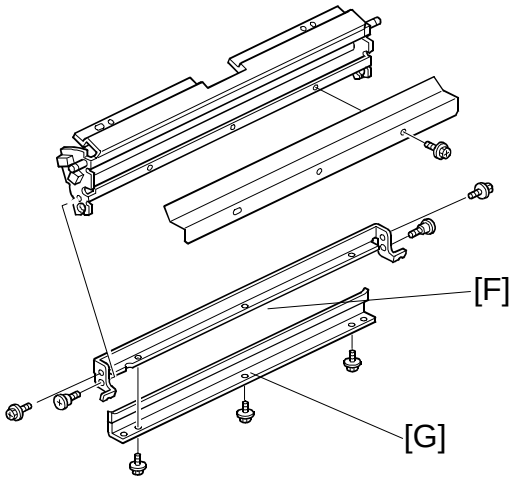
A259R502.WMF



A259R607.WMF



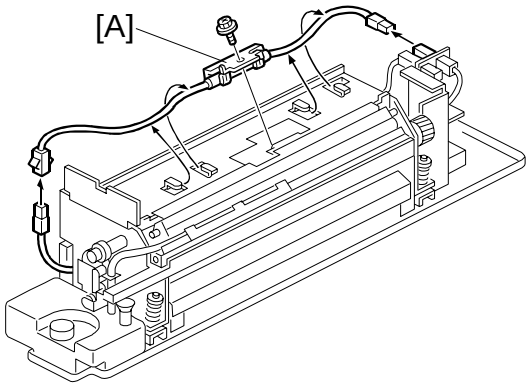
A259R519.WMF



A259R569.WMF

1. Remove the fusing unit top cover.
2. Remove the oil supply pad [A] (5 screws).
3. Remove the oil supply unit mounting screws (2 screws) and release the oil supply unit [B] from the top of the fusing unit.
4. Clean the oil supply roller [C], sub-roller [D], and hot roller blade with a dry cloth.
5. Remove the oil supply roller unit [E] (2 springs and 2 screws).
6. Remove the hot roller blade bracket [F] (4 screws).
7. Remove the hot roller blade [G] (3 screws).

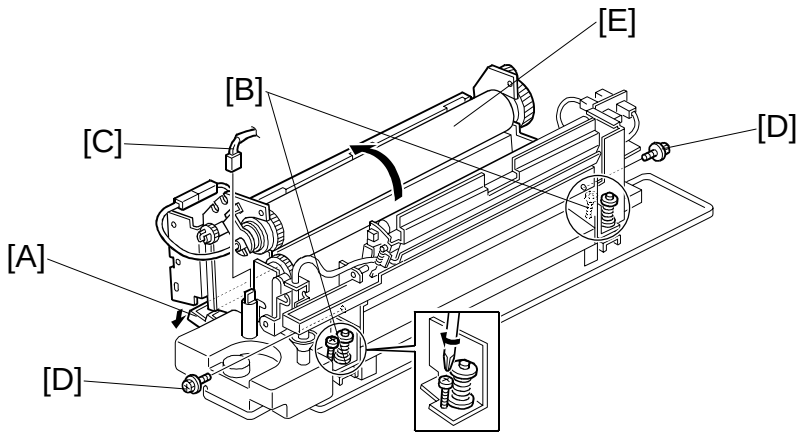
6.9.5 HOT ROLLER THERMOFUSE REPLACEMENT



A259R601.WMF

1. Remove the top cover.
2. Remove the hot roller thermofuse [A] (1 screw and 2 connectors).

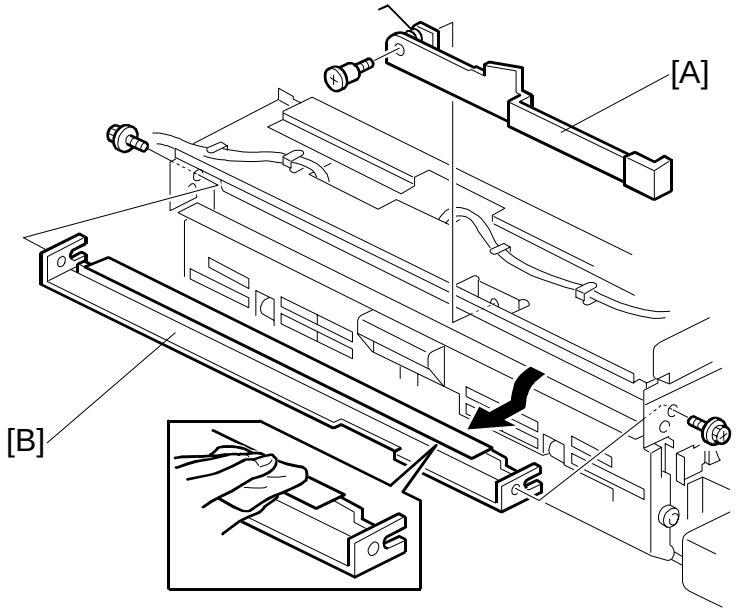
6.9.6 FUSING UNIT DISASSEMBLY



A259R602.WMF

1. Remove the top cover.
2. Remove the oil supply pad (see Oil Supply Pad Replacement).
3. Remove the oil supply unit (see Pressure Roller and Pressure Roller Fusing Lamp Removal).
4. Open the paper exit door behind the fusing unit [A].
5. Turn the pressure release screws [B] clockwise to release the pressure roller pressure.
6. Disconnect the oil end sensor connector [C].
7. Remove two lock screws [D].
8. Remove the upper fusing unit assembly [E]

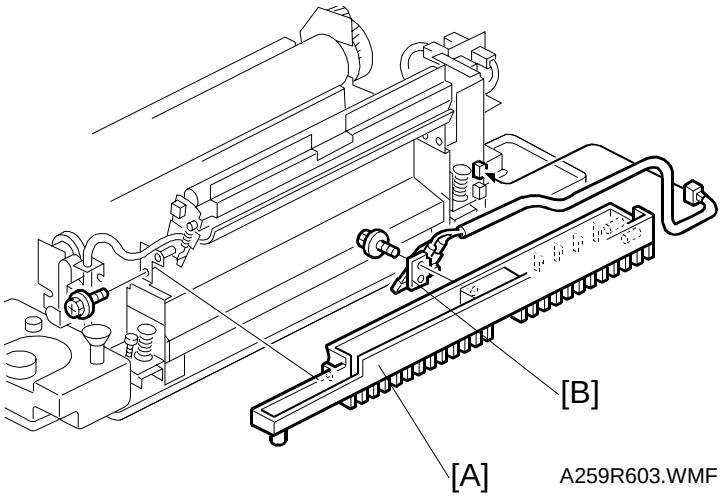
6.9.7 CLEANING ROLLER SCRAPER CLEANING



A259R518.WMF

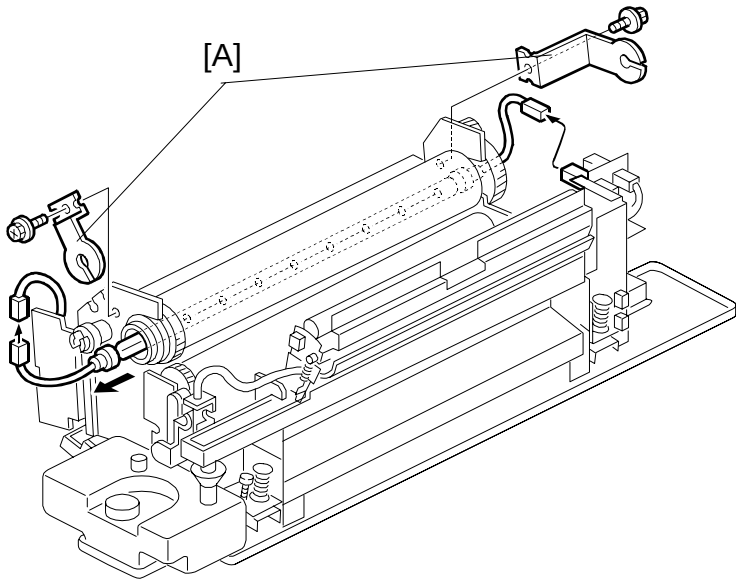
1. Remove the top cover.
2. Remove the lock lever [A] (1 step screw).
3. Remove the cleaning roller scraper [B] (2 screws).
4. Clean the cleaning roller scraper with a dry cloth.

6.9.8 HOT ROLLER THERMISTOR REPLACEMENT



1. Disassemble the fusing unit (see Fusing Unit Disassembly).
2. Remove the oil sump [A] (1 screw).
3. Replace the hot roller thermistor [B] (1 screw and 1 connector).

6.9.9 HOT ROLLER FUSING LAMP REPLACEMENT

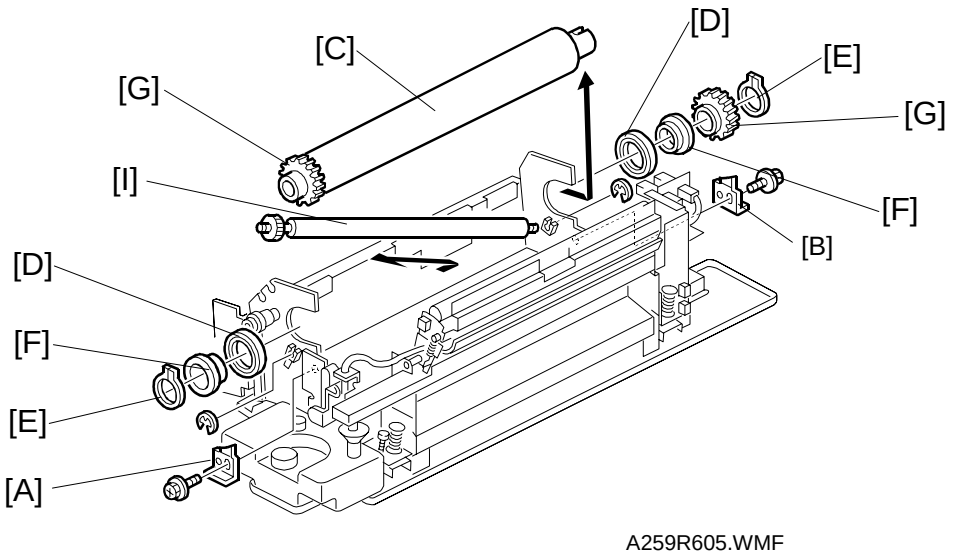


A259R507.WMF

1. Disassemble the fusing unit (see Fusing Unit Disassembly).
2. Remove the front and rear lamp holders [A] (1 screw each).
3. Replace the fusing lamp (2 connectors).

NOTE: The hot roller fusing lamp is an 800 W lamp. The rating is printed on one end of the lamp.

6.9.10 HOT ROLLER AND CLEANING ROLLER REPLACEMENT AND CLEANING



A259R605.WMF

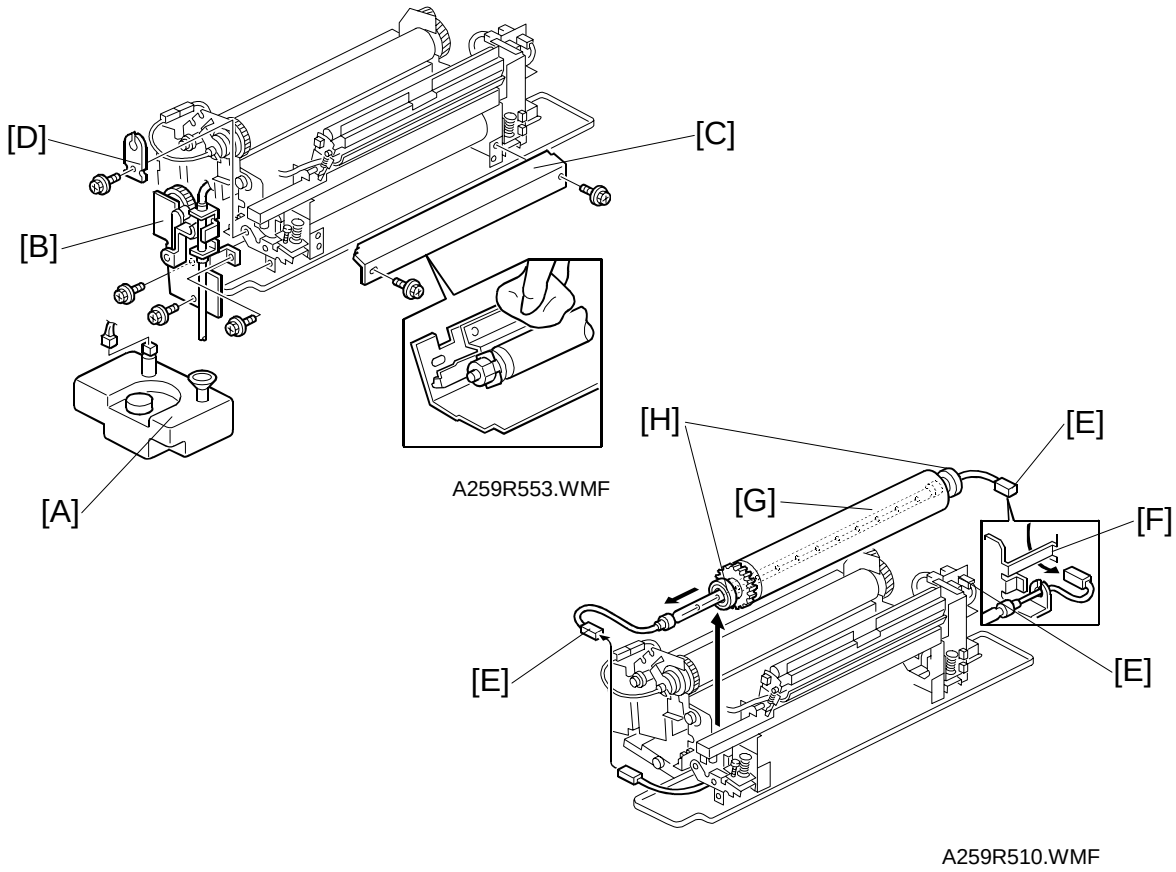
1. Disassemble the fusing unit (see Fusing Unit Disassembly).
2. Remove the hot roller fusing lamp.
3. Remove the front [A] and rear [B] roller stoppers (1 screw each).
4. Remove the hot roller [C] and hot roller shaft bearings [D] (2 C-rings [E], 2 bushings [F], 2 gears [G]).
   NOTE: Apply grease to the inner and outer surfaces of the bushings.

⚠CAUTION

Be sure to apply the grease to the bushings [F] after they have cooled. The grease vaporizes when heated. The resulting gas is harmful if inhaled.

5. Clean the cleaning roller with a suitable solvent or replace the cleaning roller [I] (2 E-rings).

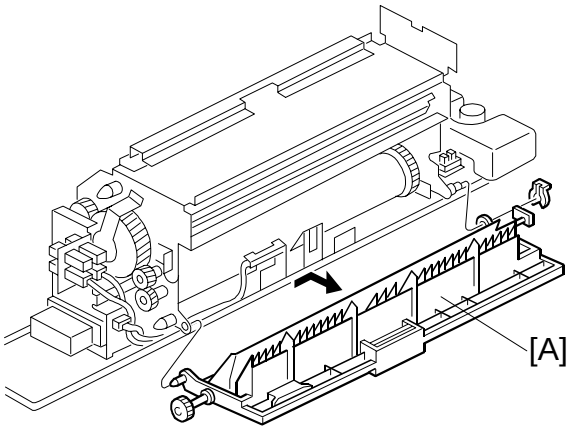
6.9.11 PRESSURE ROLLER AND PRESSURE ROLLER FUSING LAMP



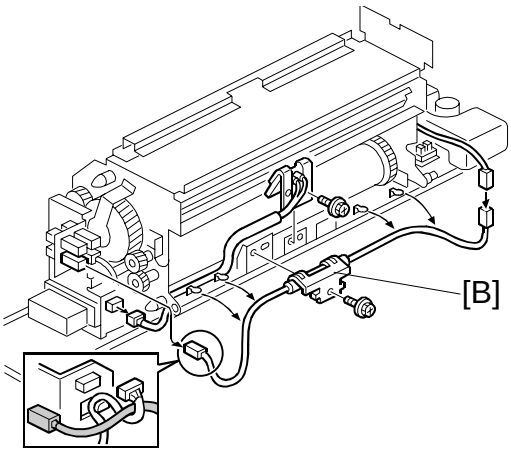
1. Disassemble the fusing unit into two parts (See Fusing Unit Disassembly, Section 6.9.6).
2. Remove the oil tank [A].
3. Remove the oil supply unit assembly [B] (3 screws).
4. Remove the entrance guide plate [C] (2 screws).
5. Remove the front lamp holder [D] (1 screw).
6. Remove the front and rear connectors [E].
7. Disconnect the rear connector [E] while keeping the other connectors in place (2 screws).
8. Slide the rear connector under the stay as shown [F].
9. Remove the pressure roller together with the pressure roller lamp [G].
10. Remove and replace the pressure roller lamp.
11. Replace the pressure roller and pressure roller bearings [H].

NOTE: The pressure roller fusing lamp is a 400 W lamp. The rating is printed on one end of the lamp.

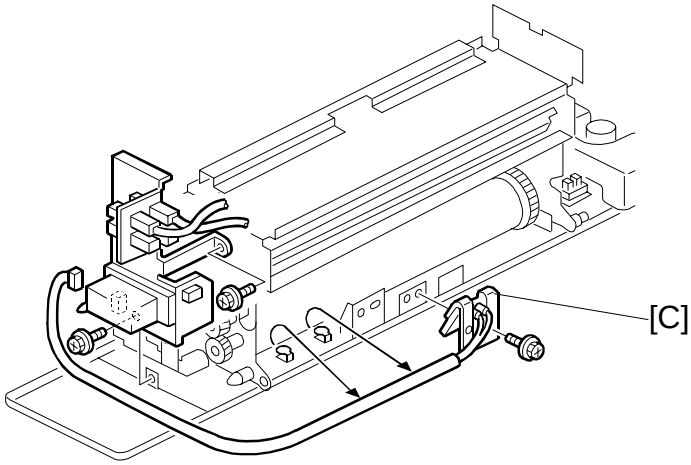
6.9.12 PRESSURE ROLLER THERMOFUSE AND THERMISTOR REPLACEMENT



A259R511.WMF



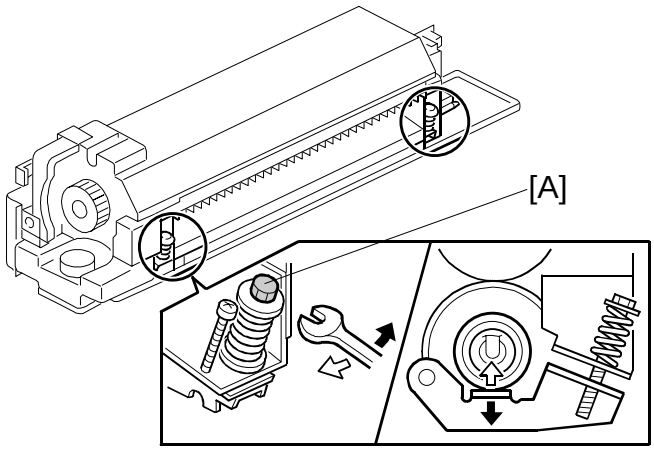
A259R512.WMF



A259R513.WMF

1. Remove the paper exit door [A] (1 snap ring).
2. Replace the pressure roller thermofuse [B] (1 screw and 2 connectors).
3. Replace the pressure roller thermistor [C] (1 screw and 2 connectors).

6.9.13 NIP BAND WIDTH ADJUSTMENT



A259R515.WMF

NOTE: 1) Check and adjust the nip band width AFTER the copier has warmed up.
2) Place an OHP sheet on the by-pass feed table before starting this procedure.
3) Use only A4/LT sideways (other sizes of OHP sheet may cause a paper jam).
4) If a sorter is connected to the copier, disconnect the sorter connector and remove the sorter, otherwise a paper jam will occur after ejecting the OHP sheet.

1. Enter SP mode and measure the fusing nip band width (SP1-109).
2. When the OHP sheet is ejected, measure the nip width of the bands.
   1) Use a rule to measure the width of the slightly opaque area on the OHP sheet.
   2) If the slightly opaque area has notched boundaries, measure the narrowest width.
   3) For both edges of the OHP sheet, measure the width 10 mm away from the edge.
3. Check that the average width of the three bands (front, rear, and center) matches the standard value.

   Standard value

   Center: 8.7 ± 0.3 mm
   Edge deviation: 0.5 mm maximum

4. If the measured nip width does not correspond to the standard value, adjust the nip width using the pressure roller screw [A].
   Then repeat steps 1 to 4 until the width is correct.

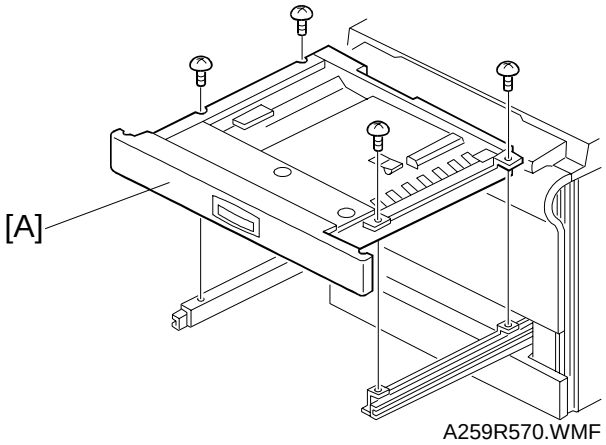
6.9.14 CAUTIONS TO BE TAKEN WHEN USING A FUSING UNIT THAT HAS BEEN IN STOCK FOR A LONG PERIOD

NOTE: When using a fusing unit that has been in stock for an extended period, press the pump with your fingers to check whether an adequate amount of oil is pumped up.

Reason: A fusing unit that has been stocked unused for a long time may have a clogged pump or valve in the oil supply unit. Such a fusing unit will not run smoothly. This may result in an oil supply shortage and the hot roller will fail earlier than normal.

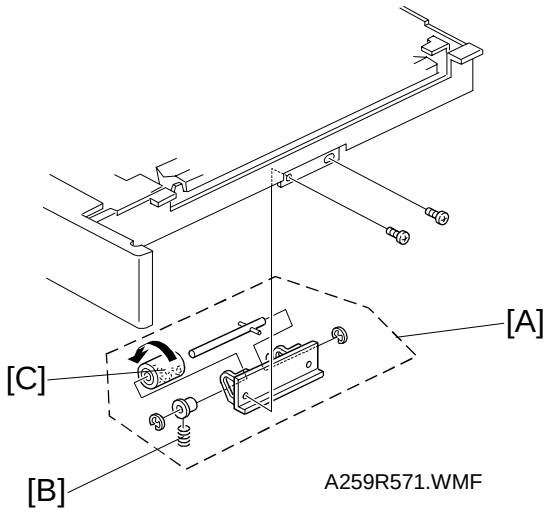
6.10 DUPLEX UNIT

6.10.1 DUPLEX UNIT REMOVAL



1. Open the duplex unit [A].
2. Remove the duplex unit (4 screws).

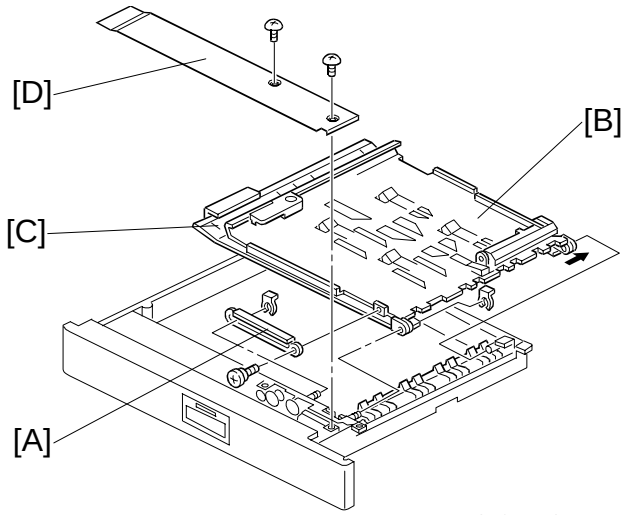
6.10.2 SEPARATION ROLLER REPLACEMENT



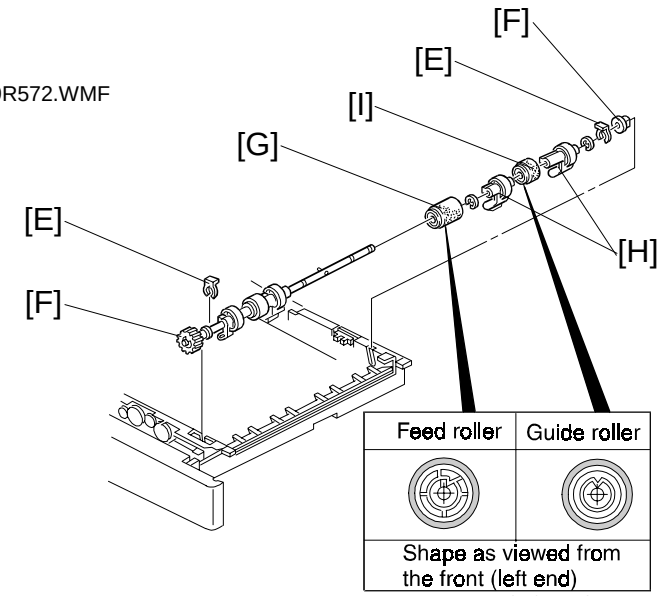
1. Remove the duplex unit (see procedure 10.1).
2. Remove the separation roller assembly [A] (2 screws).
3. Remove the spring [B].
4. Replace the separation roller [C] (2 E-rings and 2 bearings).

NOTE: Be sure to install the separation roller (one-way clutch) so that the clutch is visible.

6.10.3 FEED ROLLER REPLACEMENT



A259R572.WMF

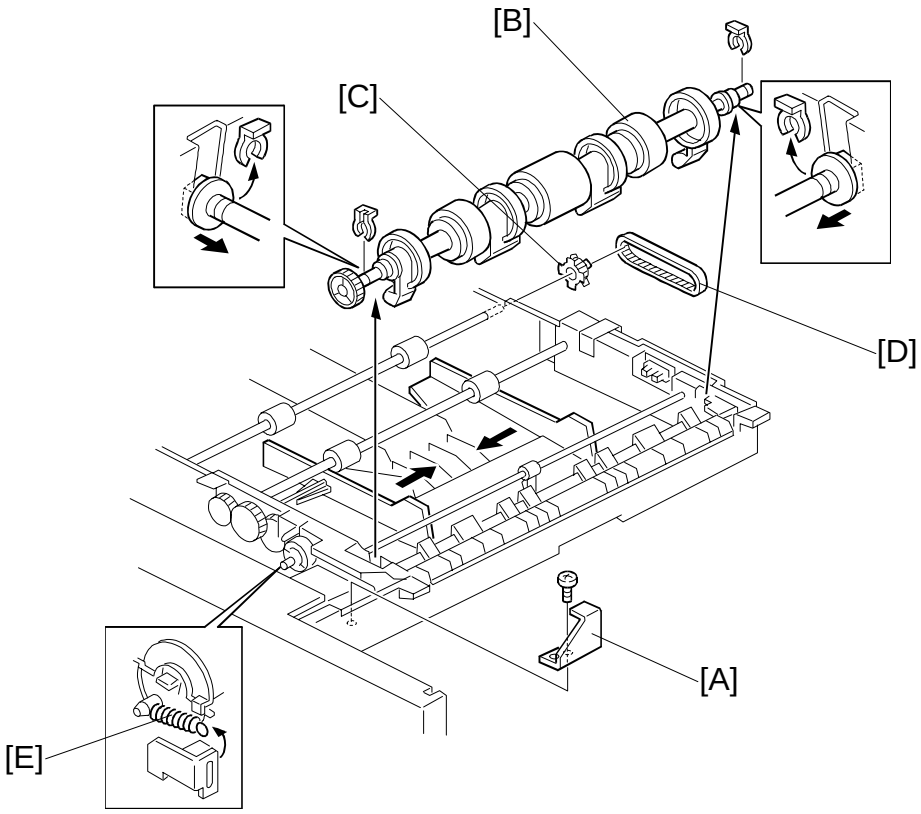


A259R573.WMF

1. Open the duplex unit.
2. Remove the guide rail [A] (1 screw and 1 snap-ring).
3. Remove the upper guide plate [B] and lower guide plate [C] (1 snap-ring).
4. Remove the inner cover [D] (2 screws).
5. Remove the 2 snap-rings [E] from both ends of the feed roller shaft.
6. Slide the bearings [F] inward.
7. Replace the feed roller [G] (2 E-rings, 2 paper flatteners [H], and 1 guide roller [I]).

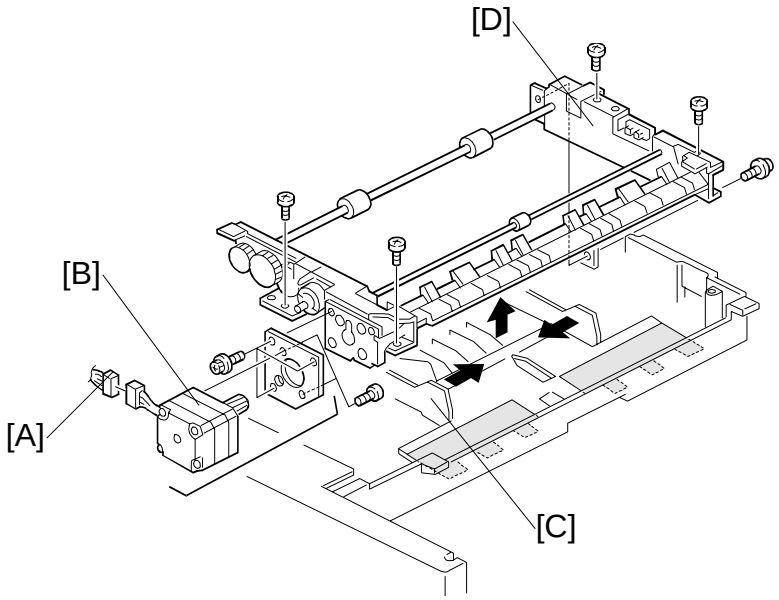
NOTE: 1) Be sure to install the feed and guide rollers correctly.
2) The feed roller is made of silicone rubber and is not compatible with the non-silicone rubber feed rollers used in some previous models.

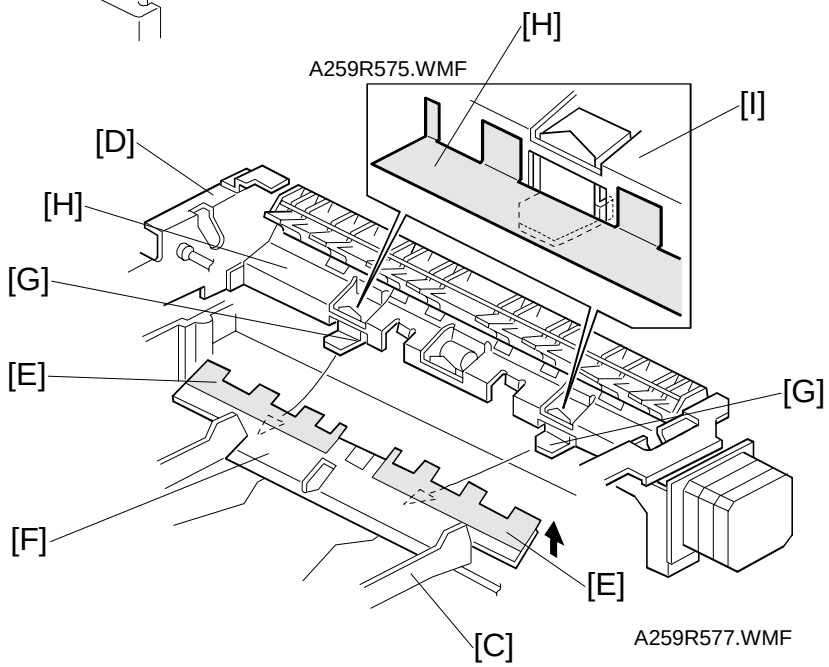
6.10.4 DUPLEX FEED MOTOR REPLACEMENT



A259R574.WMF

1. Perform steps 1 through 4 of Feed Roller Replacement.
2. Remove the bracket [A] (1 screw).
3. Remove the feed roller shaft assembly [B] (2 snap-rings).
4. Remove the pulley [C] and the timing belt [D].
5. Remove the pressure spring [E].





6. Disconnect the connector [A] of the duplex feed motor [B].
7. Close the side fences [C] and remove the duplex feed assembly [D] (5 screws).
8. Remove the duplex feed motor assembly (3 screws).
9. Replace the duplex feed motor (2 screws).

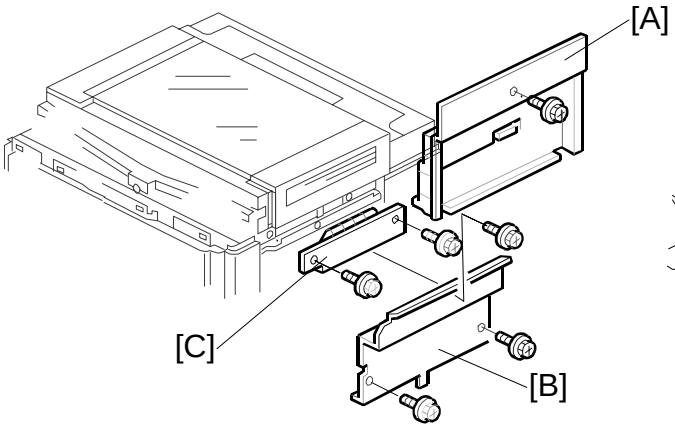
NOTE: 1) When installing the duplex feed assembly [D] on the base unit, place the bottom plate [F], with the mylar strip [E], over the bracket tabs [G].
2) Ensure the base unit's mylar strip [H] is placed against the guide plate [I], as shown. It must not go under the guide plate.

6.11 SYSTEM AND ELECTRONICS

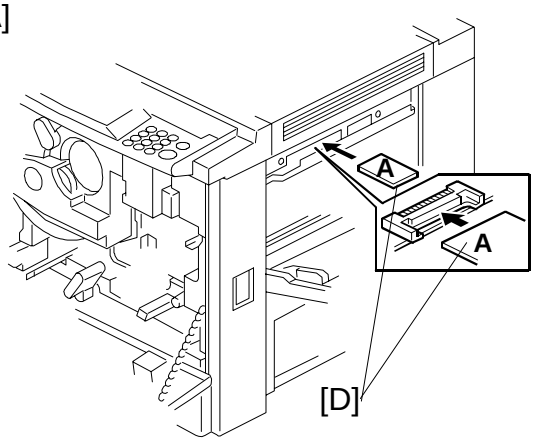
Flash ROM card handling precautions:

- Never insert or remove a Flash ROM card with the main power switch on.
- Do not turn the main power switch off during the software installation process.
- Since the Flash ROM card is a precision part, it must not be exposed to high temperature, humidity, or direct sunlight.
- Never bend, scratch, or apply excessive shock to a Flash ROM card.

6.11.1 IPU PROGRAM DOWNLOADING



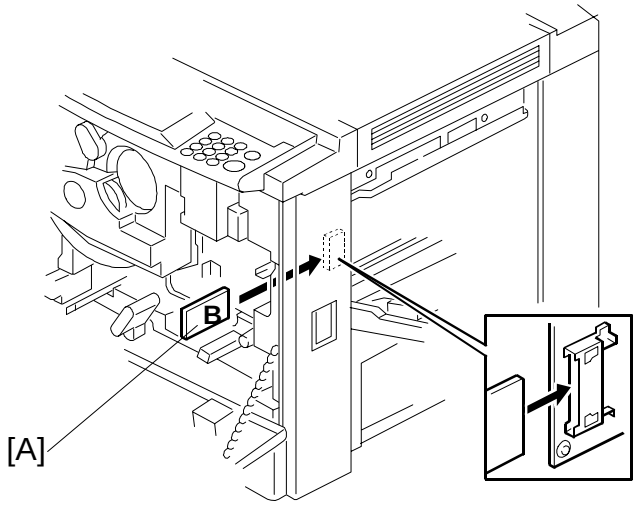
A259R521.WMF



A259R522.WMF

1. Turn off the main power switch on the copier.
2. Remove the right cover [A] (see "Covers, Fans, and Filters").
3. Remove the scanner IPU box cover [B] (2 screws) and flash ROM cover [C] (2 screws).
4. Insert the Flash ROM card [D] that contains the new IPU software.
   NOTE: Insert the Flash ROM card with side "A" facing up.
5. Turn on the main power switch. When the system starts, the program in the Flash ROM card automatically is downloaded to the scanner IPU board.
   NOTE: Do not remove the Flash ROM card from the copier or disconnect the power cord while the system is loading. When downloading the program, LED3 on the scanner IPU board lights. It takes about 30 seconds to finish downloading.
6. After downloading, LED3 turns off and LED4 starts blinking.
   NOTE: SC 690 might be displayed on the LCD. This is normal for this machine.
7. Turn off the main switch, then remove the Flash ROM card.
8. Turn on the main switch again.
9. When the copier is in standby mode, check the program version with SP 7-801-002. If the download failed, repeat the procedure.

6.11.2 MAIN PROGRAM DOWNLOADING



A259R523.WMF

1. Turn off the main power switch on the copier.
2. Open the front cover and remove the transfer inner cover (see "Covers, Fans, and Filters").
3. Insert the Flash ROM card [A] that contains the new main program.
   NOTE: Insert the Flash ROM card with side “B” facing right when viewed from the front.
4. Turn on the main power switch while keeping the front door open. This will force the machine to skip the process control initialization. When the system starts and the LCD displays the normal menu, close the front cover and go to SP5-827 to download the main program.
5. Select “OK” to start downloading.
6. Wait until end of processing is indicated on the screen (approximately 3 minutes, depending on the size of the software).
7. When an end of processing message appears, turn the main power switch off and remove the Flash ROM card.
8. Replace all covers and turn on the main power switch.
9. Check the version of the software using SP7-801-001.

NOTE: If the download fails and the LCD does not display an “OK” message, turn the main power switch off again, remove and insert the Flash ROM card, then re-execute the download procedure. If it fails again, reprogram the Flash ROM card and re-execute the download procedure.

6.11.3 NV-RAM UPLOADING AND DOWNLOADING

With SP mode, copier settings can be uploaded to a Flash ROM card from the NV-RAM inside the machine, or downloaded from a Flash ROM card to the NV-RAM. The Flash ROM card must contain the main program.

SP5-824: Upload

Executing an upload saves the copier settings (including the main counter value and serial number) onto a Flash ROM card.

SP5-825: Download

Executing a download loads copier settings (excluding the main counter value and serial number) from a Flash ROM card into the NV-RAM inside the copier.

Upload/Download Procedure

1. Print out the copier settings that have been modified from their defaults, using SP7-902.
2. Turn the main power switch off and insert the Flash ROM card into the main control board (see Main Program Downloading).
3. Turn the main power switch on and start one of the following SP modes.
   - Upload: SP5-824
   - Download: SP5-825
4. To start uploading or downloading:
   A258: Input “1”.
   A259/A260: Press “OK”.
5. Wait until end of processing is indicated on the screen (approximately 1 to 3 minutes, depending on the size of the software).
6. When an end of processing message appears, turn the main power switch off and remove the Flash ROM card.
7. Replace all covers and turn on the main power switch.
8. Using the settings list printed in step 1 using SP7-902, input the values that were different from the factory settings (after downloading).

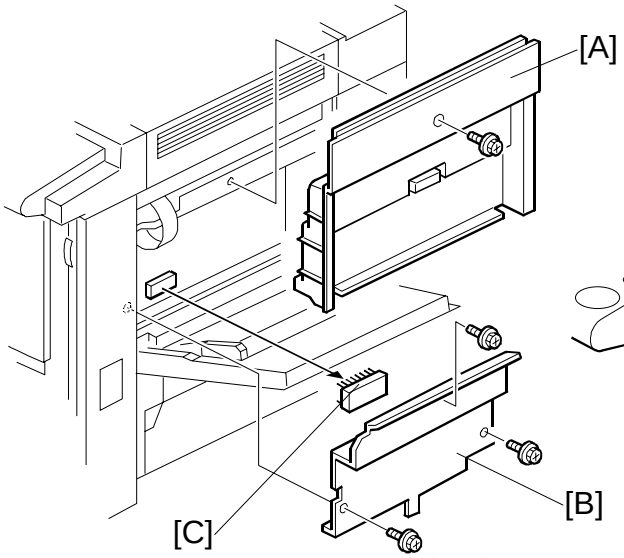
6.11.4 RAM CLEAR

RAM Clear Procedure

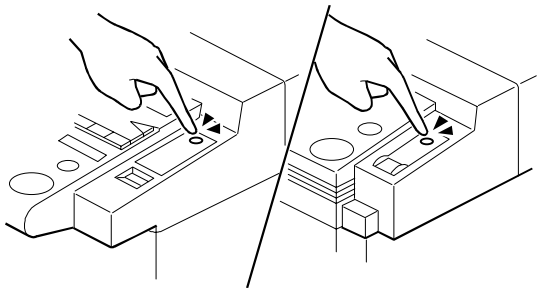
NOTE: Clearing the RAM resets all SP and UP values to the defaults, except the serial number and main counter value. Therefore, it is important to clear the RAM using the procedure shown below.

1. Before clearing the RAM, execute SP7-902 to output the SP mode values that have been changed from their default values.
2. Upload the settings from the NV-RAM onto a Flash ROM card using SP5-824 (see “NV-RAM uploading and downloading").
3. Use SP5-801 to clear the RAM.
4. Run the forced process control self-check (this is required since RAM clearing also initializes the process control data).
5. Enter the SP mode changes that were printed in step 1, or download the NV-RAM values from the Flash ROM card (see the download procedure).
6. Perform the auto color calibration (ACC) procedure.
7. If the color balance after the ACC is not satisfactory for the customer, adjust the ACC target using SP4-502 (for copier mode) and SP4-503 (for printer mode), and/or adjust the KCMY colour balance.
8. A259/A260: Calibrate the touch panel.

Precautions when replacing the NV-RAM



A259R112.WMF


A259I110.WMF

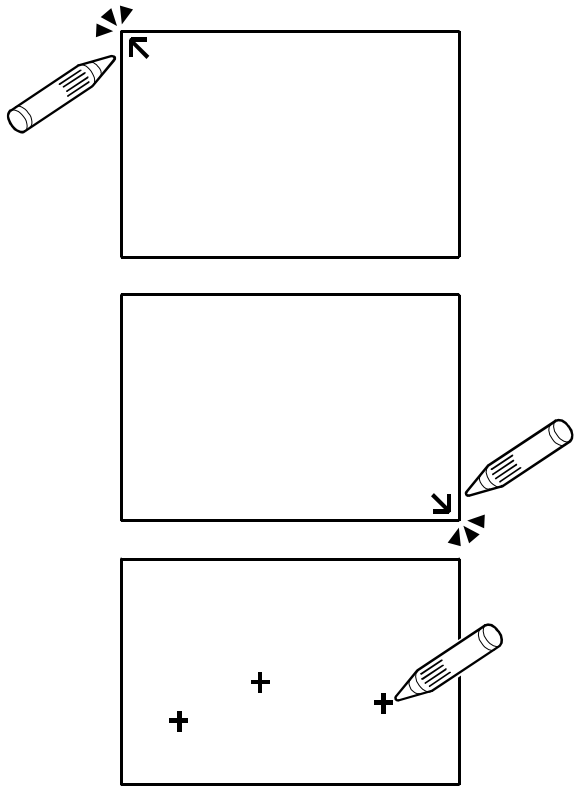
The NV-RAM stores the counter value and the copier settings.

The procedure for replacing the NV-RAM on the main control board is given below.

Make sure you have the factory settings that come with the copier before beginning the following procedure:

1. Print the SP mode values that have been modified from their default values, using SP7-902.
2. Turn the main power switch off and unplug the power cord.
3. Remove the right upper cover [A] (1 screw).
4. A259/A260 only: Remove the shield plate [B] (3 screws)().
5. Replace the NV-RAM [C] at IC106 (for A258) or IC104 (for A259/A260) on the main control board.
6. Assemble the machine in the reverse order of disassembly.
7. Turn on the main power and enter the machine's device number in the factory set mode (consult your executive for details).
8. Execute SP5-801 (RAM Clear).
9. Enter the SP mode changes you printed in step 1.
9. Perform the auto color calibration (ACC) procedure.
10. If the color balance after the ACC is not satisfactory for the customer, adjust the ACC target using SP4-501 (for copier mode) and SP4-502 (for printer mode), and/or do the KCMY color balance adjustment.
11. A259/A260: Calibrate the touch panel.

6.11.5 TOUCH PANEL CALIBRATION (A259/A260 ONLY)



A259R600.WMF

It is necessary to calibrate the touch panel in the following cases:

- After the operation panel is replaced.
- The touch panel coordinates are illegible or misaligned.
- After the NVRAM is cleared.

1. Press the key, then press and hold the C/ key (for 3 seconds or longer). The calibration screen will appear.
2. Gently touch the screen with the tip of a pen in the sequence indicated by the arrow, which appears on the screen (from upper left to lower right).
3. Touch any location with the touch pen to verify the current coordinates.
4. Terminate the calibration with the # key if the coordinates of the "+" mark almost match the point you touched. If the coordinates disagree, rerun the calibration with the C/ key.

NOTE: Do not use too sharp a tip in this procedure. The touch panel might be damaged.

7. TROUBLESHOOTING

7.1 SERVICE CALL (SC) ERRORS

7.1.1 SC TYPES AND RESETTING PROCEDURES

Type	Display Method	How to Reset
A	Fusing unit SCs displayed on the operation panel. The machine is disabled. The user cannot reset the SC.	Turn the main switch off then on before entering SP mode. Reset the SC (set SP5-810 to 1), then turn the main switch off then on again.
B	SCs that disable only the features that use the defective item. Although these SCs are not shown to the user under normal conditions, they are displayed on the operation panel only when the defective feature is selected.	Turn power off/on.
C	SCs that are not shown on the operation panel. They are internally logged.	Logging only
D	Turning the operation switch or main power switch off then on resets the SC. Displayed on the operation panel. Re-displayed if they occurred after the main power switch is turned on again.	Turn the operation switch or main power switch off and on.

All SCs are logged.

7.2 SC TABLE

See APPENDIX-3.

7.3 PROCESS CONTROL ERROR CONDITIONS

7.3.1 PROCESS CONTROL SELF-CHECK RESULTS (SP3-975-00)

Self-check results 03-975-00

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful	None		
99	Forced termination (door opened, etc.)	None	Power is turned off during self-check. Temporary main power failure	
100	ID sensor offset error		ID sensor connector disconnected	SC385 is indicated.
110	Vsg adjustment error	3-107	Dirty ID sensor, dirty drum, foreign materials or flaws on the drum	SC385 is indicated.
120	Coating weight calculation error	None	ID sensor noise interference, defective development unit, incorrect charge control unit setup, development bias error	
130	Vmin error		ID sensor noise interference, K toner density too low	
20*	γ calculation error, invalid γ or Vk value	3-122-xx	Development unit error, mixed colors	
300	Residual potential error	3-111-00	Drum anomaly, faulty LD unit, poor grounding	
31*	Vd adjustment error	None	Drum deterioration, optical fatigue	
32*	Vpl adjustment error	None	Drum anomaly, faulty LD unit	
40*	Self-check process control γ (gamma) error (unable to calculate)			
41*	Self-check process control γ (gamma) error (out of range condition)			

NOTE: 1:K, 2:Y, 3:C, and 4:M are displayed for the respective colors for items identified by an asterisk in the ‘Displayed value’ column of the table.

7.3.2 DEVELOPER SETUP RESULTS (SP3-964-00)

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful			
20*	Unable to perform calculation, invalid γ (gamma) or Vk value		Development unit error, mixed colors	
31*	Vd adjustment error		Drum deterioration, optical fatigue	
32*	Vpl adjustment error		Drum anomaly, faulty LD unit	
40*	Self-check process control γ (gamma) error (unable to calculate)		Same as process control self-check result.	
41*	Self-check process control γ (gamma) error (out of range condition)		Same as process control self-check result.	
50*	Toner end condition, etc.		Toner end sensor actuated, toner end condition	Toner end condition detected during developer replenishment.
51*	Toner supply error (γ (gamma) value will not go up when toner is replenished.)		Developer/toner supply mechanism error, toner supply motor cable disconnected	Re-run.
52*	PS potential calculation error		Developer error, ID sensor or potential sensor error	
99	Forced termination (door open, etc.)		Power turned off during self-check, temporary main power failure	
100	ID sensor offset error		ID sensor cable disconnected	
110	Vsg adjustment error		Dirty ID sensor, dirty drum, foreign materials or flaws on the drum	
120	Coating weight calculation error		ID sensor noise interference, defective development unit, incorrect charge control unit setup, development bias error	
130	Vmin error		ID sensor noise interference, BK toner density too low	
300	Residual potential error		Drum anomaly, faulty LD unit, poor grounding	

NOTE: 1:K, 2:Y, 3:C, and 4:M are displayed for the respective colors for items identified by an asterisk in the 'Displayed value' column of the table.

7.3.3 SELF-CHECK PROCESS CONTROL RELATED SCs

(1) SC385: Vsg adjustment error

The LCD displays SC385 when the output from the ID sensor is outside 1.8 ± 0.05V during Vsg adjustment.
Turning the power off then on resets this condition. However, SC385 is lit again after the end of each copy job even when this SC condition is reset by turning the power off then on. Toner is still supplied by using fixed supply mode, until a subsequent Vsg adjustment succeeds.

NOTE: Vsg adjustment timing:

- After a process control self-check (forced, power-on time, or fixed interval).
- After developer initialization (SP2-225-1 to SP2-225-5)
- When the output differs from the Vsg value measured during the preceding Vsg adjustment by more than ±0.05 V.

(2) SC386: ID sensor pattern error

The LCD displays SC386 when the M/A is out of the target range (0.2 to 0.4 mg/cm^2 for C, M, and Y toners, 0.1 to 0.3 mg/cm^2 for K toner). For example, if an M/A less than 0.2 mg/cm^2 is detected five times successively for C, M, and Y toners (or 0.1 mg/cm^2 for K toner), the machine will display an SC386.

Turning the power off then on resets this SC. Subsequently, the toner supply is carried out in normal supply mode (fuzzy control).

There are cases in which SC385 occurs before SC386 (abnormal ID sensor) output is generated because of a faulty ID sensor.

NOTE: Differences between SC385 and SC386 in their use

- SC385 is detected only when a Vsg adjustment is being performed. Consequently, it can never be detected in continuous copy mode (until self-check process controls are performed at a fixed interval or the establishment of an end of copy job condition).
- SC386 is detected during toner supply control, which is done every image production. Consequently, it is designed to be detected when abnormal toner density occurs during the development process in continuous copy mode.

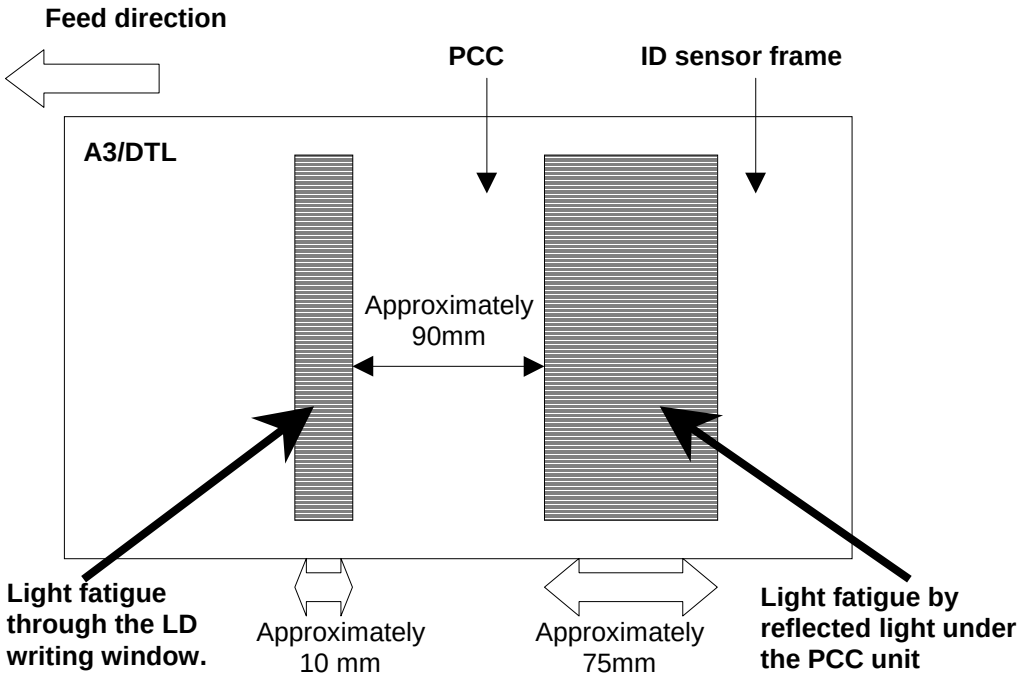
7.4 DRUM LIGHT FATIGUE

Leaving the drum exposed to direct sunlight will cause it damage. This damage creates light fatigue on the drum, an effect that will be visible on the print out. When the drawer unit is slid out, even if the drum remains in the drawer unit, it will be exposed to direct and reflected light. Light fatigue will occur if the drum is exposed for more than 2 minutes.

This section will show how to determine where light fatigue occurred on the image.

Making a print test pattern with SP mode 5-955-18 enables you to determine whether the drum has light fatigue. Follow this procedure to make a test pattern with A3 (DTL) in 1C (single color) mode using SP mode.

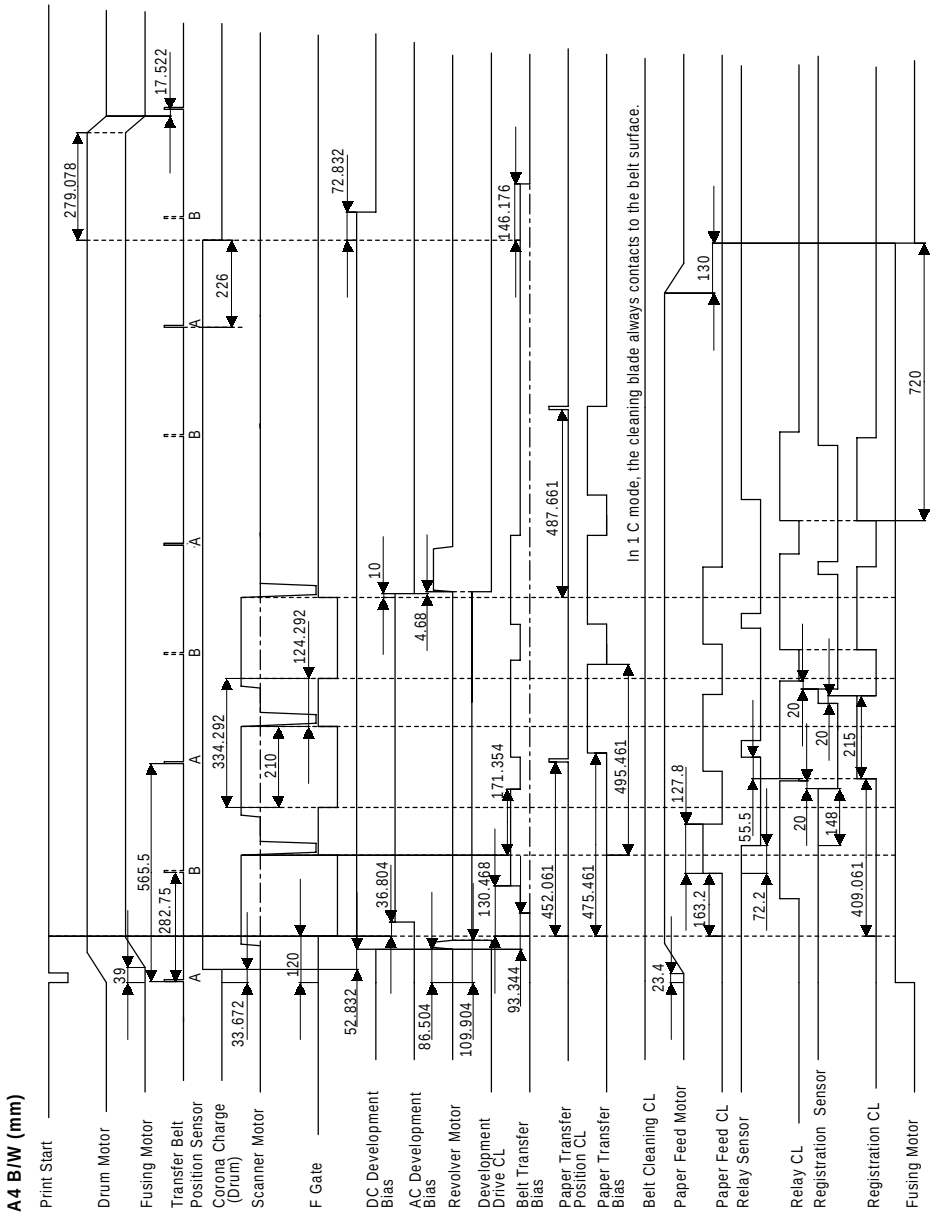
1. Enter SP mode 5-955.
2. Set SP 5-955-018 to 6 to select the Solid test pattern.
3. Set SP 5-955-001 to 51 to select the LD writing value, 51.
4. Press the key to change the LD.
5. Select A3 (DTL) size and B/W mode (or another 1C mode).
6. Press the key to make a test pattern.
7. Check whether the image has a dark uneven area.
8. If the darker area location is similar to the following figure, replace the drum.
9. After replacing the drum, set SP5-955-001 10 128 and 5-955-018 to 0.



APPENDIX-1

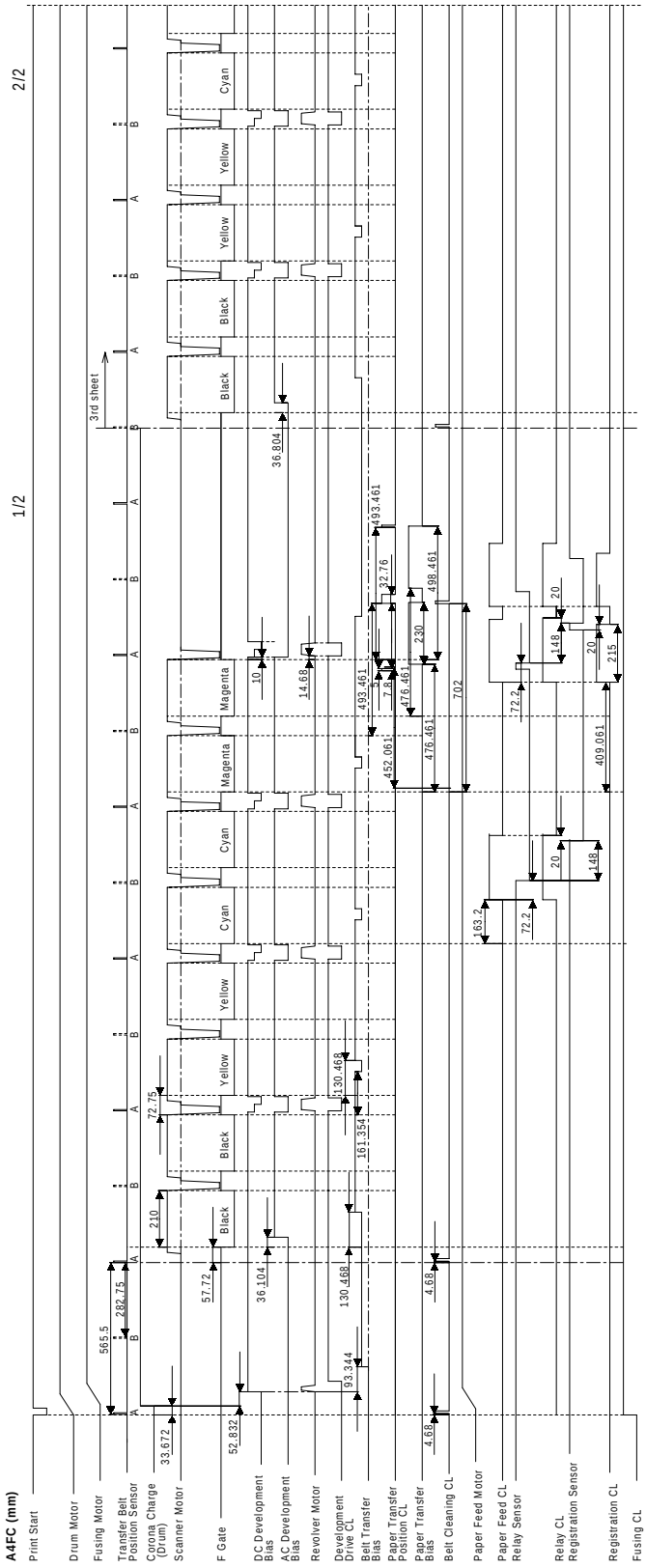
TIMING CHARTS

A4 SIZE B/W MODE



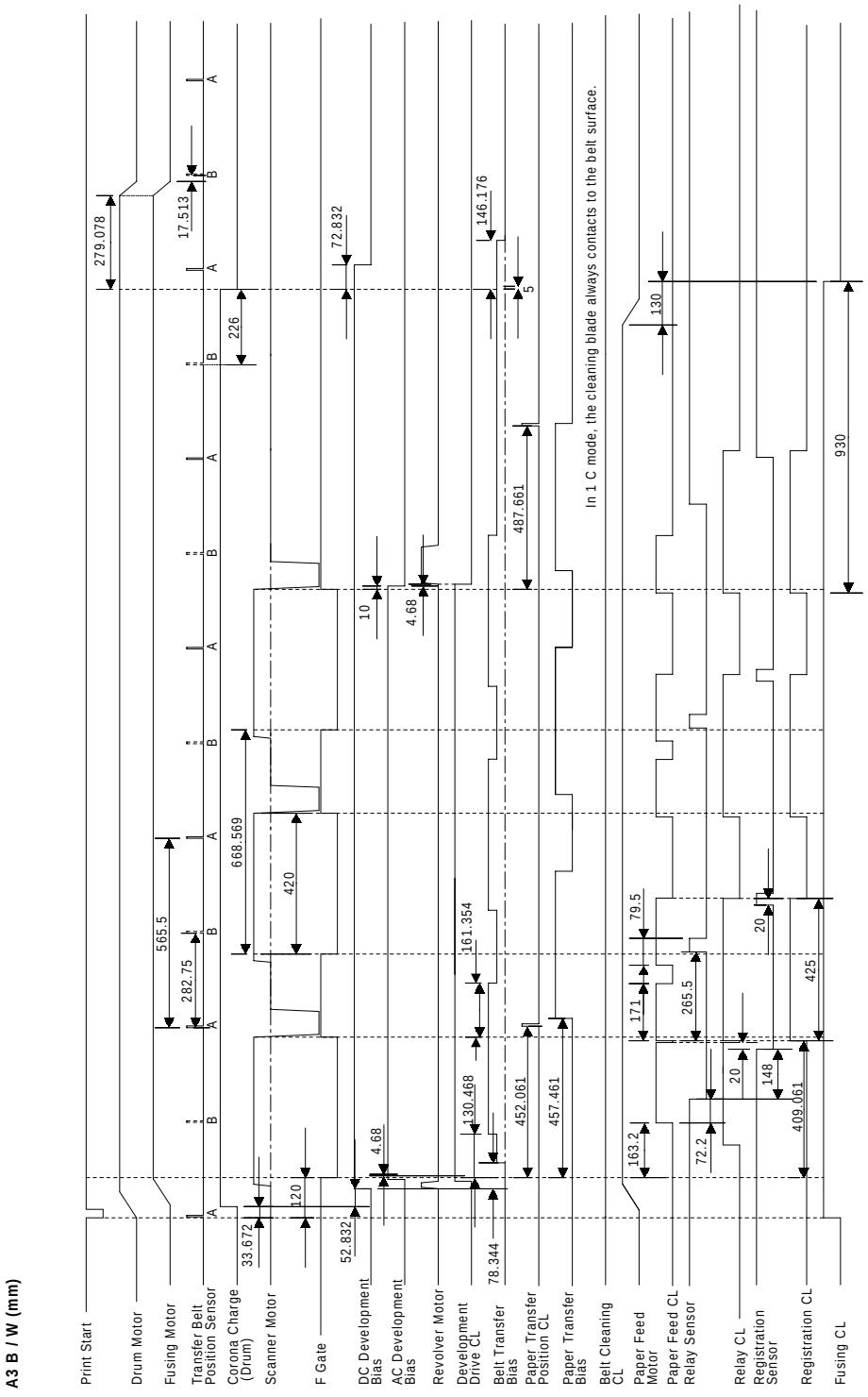
TIMMING-A4BW.WMF

A4 SIZE FULL COLOR MODE



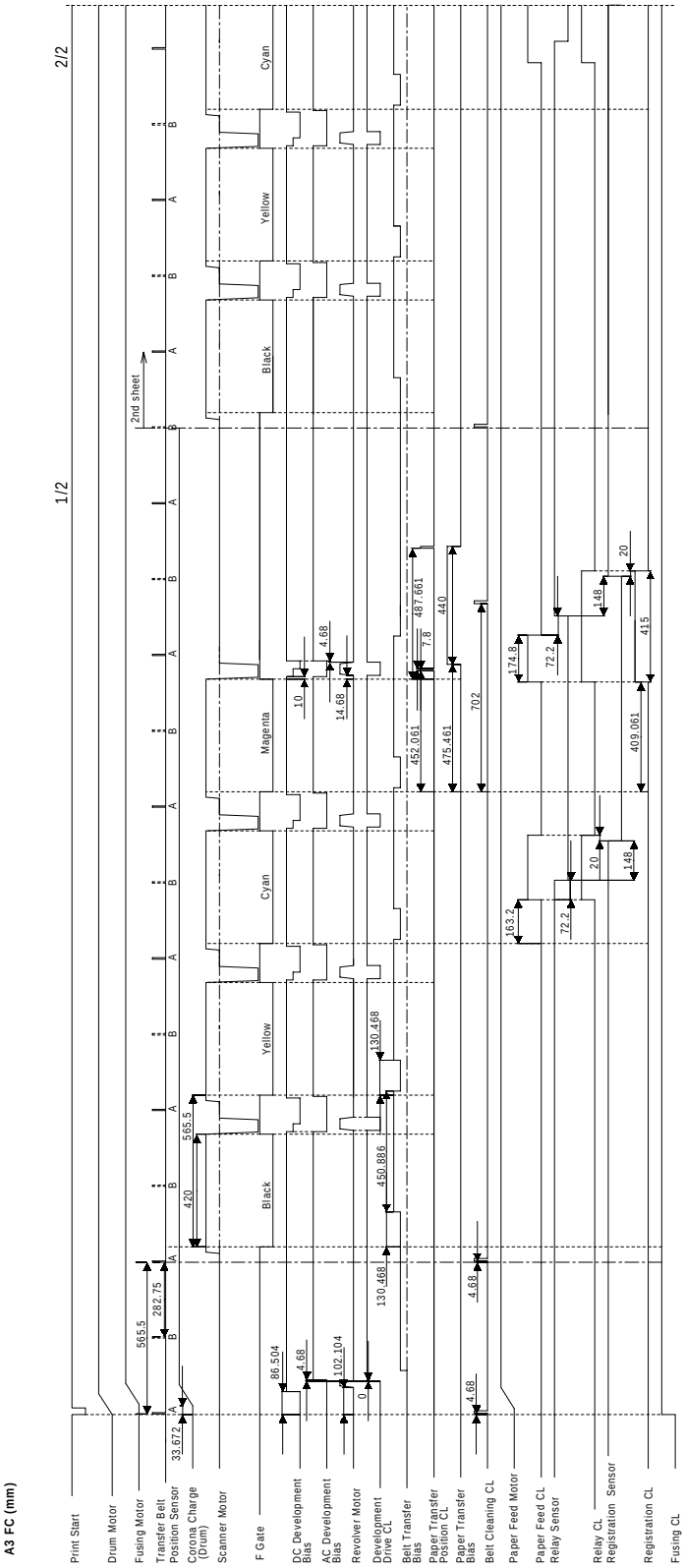
TIMMING-A4FC.WMF

A3 SIZE B/W MODE



TIMMING-A3BW.WMF

A3 SIZE FULL COLOR MODE



TIMMING-A3FC.WMF

APPENDIX-2

SP MODE TABLE

SP TABLE

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
1. Paper feed/transport/fusing units [Feed]						
01-001: Leading edge registration adjustment **[Lead Edge Regist]**						
01-001-01	**[Normal Paper]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the registration at the leading edge position by changing the registration clutch operation timing for each mode 2/3 speed: Printer mode
01-001-02	**[OHP]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-001-03	**[Thick Paper]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-001-04	**[2/3 Speed]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-002: Side-to-side registration adjustment **[Side to Side Reg]**						
01-002-01	**[By-pass]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the side-to-side registration by changing the laser main scan start position for each feed station.
01-002-02	**[Tray 1]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-002-03	**[Tray 2]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-002-04	**[Tray 3]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-002-05	**[Tray 4]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-002-06	Duplex: Side 2 **[Duplex]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-003: Paper feed timing **[P.Feed Tmg]**						
01-003-01	Normal paper, by-pass **[Normal Paper/By-ps]**	0.0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the amount of paper buckle at the registration roller by changing the time from when the registration sensor is activated until the relay clutch is turned off.
01-003-02	Tray paper feed **[Tray Feed]**	0.0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-003-03	By-pass OHP **[OHP/By-ps]**	0.0 mm	-5.0 to 5.0 mm	0.1	Yes	
01-003-04	By-pass: Thick paper **[Thick Paper/By-ps]**	2.0 mm	-5.0 to 7.0 mm	0.1	Yes	
01-003-05	Duplex: Side 2 **[Dplx Feed]**	0.0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the amount of paper buckle at the registration roller by changing the time from when the registration sensor is activated until the relay clutch is turned off.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
1-101: Oil End Sensor **[Oil End Sensor]**						
1-101-000	**[Fuser Oil End Check]**	1	0 = Not used 1 = Used	1	Yes	Specifies whether the oil end sensor is used.
01-104:						
01-104-00	Fusing control method selection **[Fusing Control]**	1	0: Phase control 1: On/off control	1	Yes	Selects the fusing temperature control mode. On/off control minimizes the radio noise generated when the fusing lamp is turned on. Phase control should only be selected if a user has problems with electrical noise or interference, such as a flickering fluorescent lamp or main power supply voltage drops. The main switch needs to be turned off and on when the setting is changed. 0 = Phase control 1 = ON/OFF control.
01-105: Hot/pressure roller temperature settings **[Roller.Tmp Set]**						
01-105-01	Hot roller, 1st side, Idling **[Hot Rllr/ Idling]**	163 °C	100 to 200 °C	1	Yes	Sets the temperature at which idling starts. Idling starts for 2 minutes when the temperature becomes over the target - 15 °C. If the temperature is higher than 50 °C when the power relay turns on, idling is not executed.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
01-105-02	Hot roller, 1st side, Standby mode **[Hot Rllr/ Standby]**	165 °C	100 to 200 °C	1	Yes	Sets the target operating temperatures of the hot and pressure rollers in various modes.
01-105-03	Hot roller, 1st side, Copy mode, Normal paper, FC **[Hot Rllr/ Nrml: FC]**	165°C	100 to 200 °C	1	Yes	
01-105-04	Hot roller, 1st side, Copy mode, Normal paper, 1C **[Hot Rllr/ Nrml: SC]**	160 °C	100 to 200 °C	1	Yes	
01-105-05	Hot roller, 1st side, Copy mode, OHP/Thick paper, FC **[Hot Rllr/ OHP/Thick: FC]**	160 °C	100 to 200 °C	1	Yes	
01-105-06	Hot roller, 1st side, Copy mode, OHP/Thick paper, 1C **[Hot Rllr/ OHP/Thick: SC]**	150 °C	100 to 200 °C	1	Yes	
01-105-07	Pressure roller, 1st side, Standby mode **[Pressure Rllr/ Standby]**	150 °C	100 to 200 °C	1	Yes	
01-105-08	Pressure roller, 1st side, Copy mode, Normal paper, FC **[Pressure Rllr/ Nrml: FC]**	150 °C	100 to 200 °C	1	Yes	
01-105-09	Pressure roller, 1st side,: Copy mode, Normal paper, 1C **[Pressure Rllr/ Nrml: SC]**	150 °C	100 to 200 °C	1	Yes	
01-105-10	Pressure roller, 1st side, Copy mode, OHP/Thick paper, FC **[Pressure Rllr/ OHP/Thick: FC]**	150 °C	100 to 200 °C	1	Yes	
01-105-11	Pressure roller, 1st side, Copy mode, OHP/Thick paper, 1C **[Pressure Rllr/ OHP/Thick: SC]**	150 °C	100 to 200 °C	1	Yes	
01-105-12	Hot roller, 2nd side, Standby mode **[Hot Rllr/ Standby: Dplx]**	165 °C	100 to 200 °C	1	Yes	
01-105-13	Hot roller, 2nd side, Copy mode, Normal paper, FC **[Hot Rllr/ Nrml: FC: Dplx]**	165°C	100 to 200 °C	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
01-105-14	Hot roller, 2nd side, Copy mode, Normal paper, 1C **[Hot Rllr/ Nrml: SC: Dplx]**	160 °C	100 to 200 °C	1	Yes	Sets the number of forced toner supply operations.
01-105-15	Hot roller, 2nd side, Copy mode, OHP/Thick paper, FC **[Hot Rllr/ OHP/Thick: FC: Dplx]**	160 °C	100 to 200 °C	1	Yes	Sets the target operating temperatures of the hot and pressure rollers in various modes.
01-105-16	Hot roller, 2nd side, Copy mode, OHP/Thick paper, 1C **[Hot Rllr/ OHP/Thick: SC: Dplx]**	150 °C	100 to 200 °C	1	Yes	
01-105-17	Pressure roller, 2nd side, Standby mode **[Pressure Rllr/ Standby: Dplx]**	150 °C	100 to 200 °C	1	Yes	
01-105-18	Pressure roller, 2nd side, Copy mode, Normal paper, FC **[Pressure Rllr/ Nrml: FC: Dplx]**	150 °C	100 to 200 °C	1	Yes	
01-105-19	Pressure roller, 2nd side, Copy mode, Normal paper, 1C **[Pressure Rllr/ Nrml: SC: Dplx]**	150 °C	100 to 200 °C	1	Yes	
01-105-20	Pressure roller, 2nd side, Copy mode, OHP/Thick paper, FC **[P Rllr/ OHP/Thick: FC: Dplx]**	150 °C	100 to 200 °C	1	Yes	
01-105-21	Pressure roller, 2nd side, Copy mode, OHP/Thick paper, 1C **[P Rllr/ OHP/Thick: SC: Dplx]**	150 °C	100 to 200 °C	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
01-106: Fusing temperature display **[Roller Tmp. Display]**						
01-106-01	Lower roller **[Pressure Roller Temp]**	°C	to °C			Displays the surface temperature at the center of the pressure roller (lower roller) in °C.
01-106-02	Upper roller **[Hot Roller Temp]**	°C	to °C			Displays the surface temperature at the center of the hot roller (upper roller) in °C.
1-108: Fusing unit detection **[Fusing Unit Set]**						
01-108-00	**[Fusing Unit Set]**	0	0: Detection 1: No detection	1		Set to 1 during PM as described in the PM flow chart, to save time during PM. After the main switch is turned off/on, this setting goes back to the default, “0” automatically.
01-109: **[Fusing nip width measurement]**						
01-109-00	**[Fusing Nip Band Wdth]**		0: OFF 1: ON	-		Feeds an OHP sheet and stops 3 times for 2 seconds in between the hot and pressure rollers. Measure the width of the three roller traces that are developed on the OHP sheet because of these pauses. Set this SP to ‘1’ and press the Enter key to start feeding. See Replacement & Adjustment – Nip Band Width Adjustment for how to use this SP mode.
01-801: Motor speed adjustments **[Motor Speed Adjustment]**						
01-801-01	Fusing motor speed adjustment: Standard speed **[Fusing Mt: Normal Spd]**	0.0%	-0.1 to 1.0%	0.1		Do not adjust the factory settings.
01-801-02	Paper feed motor speed adjustment: Standard speed **[P Feed Mt: Normal Spd]**	0.1%	-0.1 to 1.0%	0.1		
01-801-03	Drum motor speed adjustment: Standard speed **[Drum Mt: Normal Spdl]**	-0.8%	-0.1 to 1.0%	0.1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
01-801-04	Fusing motor speed adjustment: Half speed **[Fusing Mt: Half Spd]**	0.0%	-0.1 to 1.0%	0.1		Do not adjust the factory settings.
01-801-05	Paper feed motor speed adjustment: Half speed **[P Feed Mt: Half Spd]**	0.1%	-0.1 to 1.0%	0.1		
01-801-06	Drum motor speed adjustment: Half speed **[Drum Mt: Half Spd]**	-0.8%	-0.1 to 1.0%	0.1		Do not adjust the factory settings.
01-801-07	Fusing motor speed adjustment: 2/3 speed **[Fusing Mt: 2/3 Spd]**	0.0%	-0.1 to 1.0%	0.1		
01-801-08	Paper feed motor speed adjustment: 2/3 speed **[P Feed Mt: 2/3 Spd]**	0.1%	-0.1 to 1.0%	0.1		
01-801-09	Drum motor speed adjustment: 2/3 speed **[Drum Mt: 2/3 Spd]**	-0.8%	-0.1 to 1.0%	0.1		
01-901 Fence Position **[Fence Position]**						
01-901-01	Duplex side fence spacing adjustment **[Dplx Side Fence Adjust]**	0.0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the side fence stop position of the duplex unit.
01-901-02	Duplex end fence spacing adjustment **[Dplx End Fence Adjust]**	0.0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the end fence stop position of the duplex unit.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
2. Drum unit [Drum]						
02-101: Feed and scanning margin adjustments **[Blnk Mrgn]**						
02-101-01	Feed margin adjustment: Leading edge: Normal paper **[Lead Edge: Normal]**	0 mm	-4.0 to 4.0 mm	0.1	Yes	Adjusts the margins in the feed (sub-scan) direction.
02-101-02	Feed margin adjustment: Leading edge: Thick paper **[Lead Edge: Thick]**	0 mm	-4.0 to 4.0 mm	0.1	Yes	
02-101-04	Feed margin adjustment: Leading edge: OHP **[Lead Edge: OHP]**	0 mm	-4.0 to 4.0 mm	0.1	Yes	
02-101-05	Feed margin adjustment: Trailing edge: Normal paper **[Trail Edge: Normal]**	0 mm	-3.0 to 10.0 mm	0.1	Yes	
02-101-06	Feed margin adjustment: Trailing edge: Thick paper **[Trail Edge: Thick]**	0 mm	-3.0 to 10.0 mm	0.1	Yes	Adjusts the margins in the feed (sub-scan) direction.
02-101-08	Feed margin adjustment: Trailing edge: OHP **[Trail Edge: OHP]**	0 mm	-3.0 to 10.0 mm	0.1	Yes	
02-101-09	Scanning margin adjustment: Front edge **[Main Scan Head Side]**	0 mm	-2.0 to 5.0 mm	0.1	Yes	Adjusts the margins in the main scan direction.
02-101-10	Scanning margin adjustment: Rear edge **[Main Scan Rear Side]**	0 mm	-2.0 to 5.0 mm	0.1	Yes	
02-101-11	Feed margin adjustment: Auto duplex: 1st side **[Trail Edge: Auto Dplx 1side]**	0 mm	-3.0 to 10.0 mm	0.1	Yes	Adjusts the margins in the feed (sub-scan) direction for duplex mode.
02-101-12	Feed margin adjustment: Auto duplex: 2nd side **[Trail Edge: Dplx 2 side]**	0 mm	-3.0 to 10.0 mm	0.1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-112: Main-scan magnification adjustment (adjusts the laser diode clock frequency) **[Main Scn Mag]**						
02-112-01	Copy mode (400 DPI) **[Lsync Mag Adj COPY]**	0%	-1.00 to 1.00%	0.01	Yes	Adjusts the magnification in the main-scan direction for copier mode. For copier mode, keep this at the factory settings.
02-112-02	Print mode (600 DPI) **[Lsync Mag Adj PRINTER]**	0%	-1.00 to 1.00%	0.01	Yes	Adjusts the magnification in the main-scan direction for printer mode. For how to use this SP mode, see SP 2-113-02.
02-113: Sub-scan magnification adjustment (adjusts the polygon mirror motor speed) **[Sub Scn Mag]**						
02-113-01	Copy mode (400 DPI) **[Fsync Mag Adj COPY]**	0%	-1.0 to 1.0%	0.1	Yes	Adjusts the magnification in the sub-scan direction for copier mode. For copier mode, keep this at the factory settings. To adjust the sub scan magnification, use SP 4-008 to adjust the scanner motor speed.
02-113-02	Print mode (600 DPI) **[Fsync Mag Adj PRINTER]**	0%	-1.0 to 1.0%	0.1	Yes	Adjusts the magnification in the sub-scan direction for printer mode. To use this SP mode, do the following: Print the trim pattern using pattern 1 in SP5-955-018. Then check that the margins on the trim pattern are as follows: Lead edge: 5mm (target) +/- 2 mm Trailing edge: 2mm (target) +2mm/-1.5mm Side (target): 1.5mm, Side (specification): 2+/-2mm. Adjust the magnification in the sub scan direction first using SP 2-113-02. Then print the trim pattern again. Then adjust the magnification in the main scan direction with 2-113-01. Adjust SP2-113-02 (sub scan) first and print the trim pattern again before adjusting 2-112-02 (main scan), because SP2-113-02 also affects the main scan magnification Note: Do not adjust SP2-113-002 by more than +/- 0.5% at any one time.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-207: Forced toner supply **[Forced Toner Splly]**						
02-207-01	**[K]**	0	0: OFF, 1: ON	-		Moves the toner cartridge of the selected color to the development position and forces toner to be supplied in accordance with the settings of SP2-208.
02-207-02	**[C]**	0	0: OFF, 1: ON	-		
02-207-03	**[M]**	0	0: OFF, 1: ON	-		
02-207-04	**[Y]**	0	0: OFF, 1: ON	-		
02-208: Toner supply **[Toner Supply]**						
02-208-01	Forced toner supply count setup: K **[Forced: Times: K]**	5	1 to 50	1		Sets the number of forced toner supply operations.
02-208-02	Forced toner supply count setup: C **[Forced: Times: C]**	5	1 to 50	1		
02-208-03	Forced toner supply count setup: M **[Forced: Times: M]**	5	1 to 50	1		
02-208-04	Forced toner supply count setup: Y **[Forced: Times: Y]**	5	1 to 50	1		Sets the number of forced toner supply operations.
02-208-05	Fixed supply mode toner supply rate: K **[Fixed: Ratio: K]**	5%	0 to 100%	1		Sets the toner supply rate to be used when the toner supply method SP2-208-09 is set to 0 (fixed supply mode).
02-208-06	Fixed supply mode toner supply rate: C **[Fixed: Ratio: C]**	5%	0 to 100%	1		
02-208-07	Fixed supply mode toner supply rate: M **[Fixed: Ratio: M]**	5%	0 to 100%	1		
02-208-08	Fixed supply mode toner supply rate: Y **[Fixed: Ratio: Y]**	5%	0 to 100%	1		
02-208-09	Toner supply method **[Mode: 0:FIX, 1:PRP, 2:FZY]**	2	0 to 2	1		Selects the toner supply method. 0: Fixed supply, 1: Proportional control supply (Not available for A258/A259/A260), 2: Fuzzy control supply. **Do not set to 1.**

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
2-212: Toner near-end threshold **[Toner Near End Thd]**						
2-212-001	Black toner **[bBkMATnNEnd]**	0.05mg/cm^2	0.000 to 1.00	0.001		Do not change the factory settings unless directed by technical support staff..
2-212-002	CMY toner **[bClMATnNEnd]**	0 mg/cm^2	0.000 to 1.00	0.001		
02-225: Developer setup execution **[Dev. Agitation]**						
02-225-01	**[K]**		0: OFF 1: ON	1		Performs developer initialization and forced process control self-check for the selected colour and displays the operation result. Do this at installation and after changing the developer. 0 = Failure 1 = Success Also see SP 3-964 for the results.
02-225-02	**[C]**		0: OFF 1: ON	1		
02-225-03	**[M]**		0: OFF 1: ON	1		
02-225-04	**[Y]**		0: OFF 1: ON	1		
02-225-05	**[All Color]**		0: OFF 1: ON	1		
02-225-06	**[CMY]**		0: OFF 1: ON	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
2-301: Belt transfer bias **[Belt transfer bias]**						
2-301-01	1st colour, 4C mode **[1st 4C-mode]**	1700	300 to 3000	1	Yes	Half speed: OHP/thick paper modes 2/3 speed: Printer mode 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B) Normally, do not adjust these settings, except in response to specific field problems as directed by technical support staff. 2-301-24: Turns the correction mode on or off. If on, the transfer belt bias for image areas is corrected if the pointer table row number is within a certain range. 0 = ON 1 = OFF
2-301-02	2nd colour, 4C mode **[2nd 4C-mode]**	1800	300 to 3000	1	Yes	
2-301-03	3rd colour, 4C mode **[3rd 4C-mode]**	1900	300 to 3000	1	Yes	
2-301-04	4th colour, 4C mode **[4th 4C-mode]**	2000	300 to 3000	1	Yes	
2-301-05	1st colour, 2C mode **[1st 2C-mode]**	1700	300 to 3000	1	Yes	
2-301-06	2nd colour, 2C mode **[2nd 2C-mode]**	1800	300 to 3000	1	Yes	
2-301-07	1st colour, 3C mode **[1st 3C-mode]**	1700	300 to 3000	1	Yes	
2-301-08	2nd colour, 3C mode **[2nd 3C-mode]**	1800	300 to 3000	1	Yes	
2-301-09	3rd colour, 3C mode **[3rd 3C-mode]**	1900	300 to 3000	1	Yes	
2-301-10	1st colour, 1C mode **[1st 1C-mode]**	1700	300 to 3000	1	Yes	
2-301-11	**[Between image Areas]**	1000	300 to 3000	1	Yes	
2-301-12	**[Half Spd: Image Area]**	1000	300 to 3000	1	Yes	
2-301-13	**[2/3 1st 4C-mode]**	800	300 to 3000	1	Yes	
2-301-14	**[2/3 2nd 4C-mode]**	900	300 to 3000	1	Yes	
2-301-15	**[2/3 3rd 4C-mode]**	1000	300 to 3000	1	Yes	
2-301-16	**[2/3 4th 4C-mode]**	1100	300 to 3000	1	Yes	
2-301-17	**[2/3 1st 2C-mode]**	1200	300 to 3000	1	Yes	
2-301-18	**[2/3 2nd 2C-mode]**	1300	300 to 3000	1	Yes	
2-301-19	**[2/3 1st 3C-mode]**	800	300 to 3000	1	Yes	
2-301-20	**[2/3 2nd 3C-mode]**	900	300 to 3000	1	Yes	
2-301-21	**[2/3 3rd 4C-mode]**	1000	300 to 3000	1	Yes	
2-301-22	**[2/3 1st 1C-mode]**	1200	300 to 3000	1	Yes	
2-301-23	**[2/3 Spd: Between Image Areas]**	1700	300 to 3000	1	Yes	
2-301-24	Bias Correction on/off **[Vd Correction Mode: 0:On,1:OFF]**	0	0: ON 1: OFF	1		
2-301-25	Half speed, between images **[Half Spd: No Image Area]**	1700	300 to 3000	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-310: Paper transfer bias setup **[Belt transfer bias]**						
02-310-01	Paper transfer forced environment switchover **[Paper transfer bias]**	1	0 to 3	1		Specifies whether the transfer bias is to be switched according to the detected value from the humidity sensor, or whether it is to stay fixed at the values for normal or low humidity (these values depend on the settings of SP2-316). 0: No environment switching, kept at standard conditions 1: Conditions depend on the sensor (default) 2: No environment switching, kept at low humidity conditions 3: No environment switching, kept at high humidity conditions
02-310-02	Image area: Normal paper: 1C **[NRML 1C]**	7 µA	1 to 50 µA	1	Yes	Adjusts the paper transfer belt bias for various paper types and modes. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B) Adjust only if there are problems with insufficient transfer in the image area of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff.
02-310-03	Image area: Normal paper: 2C **[NRML 2C]**	15 µA	1 to 50 µA	1	Yes	
02-310-04	Image area: Normal paper: 4C **[NRML 3C]**	15 µA	1 to 50 µA	1	Yes	
02-310-05	Image area: Normal paper: 1C **[NRML 4C]**	15 µA	1 to 50 µA	1	Yes	
02-310-06	Image area: Thick paper: 1C **[THICK 1C]**	8 µA	1 to 50 µA	1	Yes	
02-310-07	Image area: Thick paper: 2C **[THICK 2C]**	10 µA	1 to 50 µA	1	Yes	
02-310-08	Image area: Thick paper: 3C **[THICK 3C]**	10 µA	1 to 50 µA	1	Yes	
02-310-09	Image area: Thick paper: 4C **[THICK 4C]**	10 µA	1 to 50 µA	1	Yes	
02-310-10	Image area: OHP:1C **[OHP 1C]**	7 µA	1 to 50 µA	1	Yes	
02-310-11	Image area: OHP:2C **[OHP 2C]**	10 µA	1 to 50 µA	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-310-12	Image area: OHP:3C **[OHP 3C]**	10 µA	1 to 50 µA	1	Yes	Adjusts the paper transfer belt bias for various paper types and modes. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B) Adjust only if there are problems with insufficient transfer in the image area of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff.
02-310-13	Image area: OHP:4C **[OHP 4C]**	10 µA	1 to 50 µA	1	Yes	
02-310-14	Image area: 2/3 speed: 1C **[NRML_2/3 1C]**	7 µA	1 to 50 µA	1	Yes	
02-310-15	Image area: 2/3 speed: 2C **[NRML_2/3 2C]**	15 µA	1 to 50 µA	1	Yes	
02-310-16	Image area: 2/3 speed: 3C **[NRML_2/3 3C]**	15 µA	1 to 50 µA	1	Yes	
02-310-17	Image area: 2/3 speed: 4C **[NRML_2/3 4C]**	15 µA	1 to 50 µA	1	Yes	
02-310-18	Image area: Normal paper, back side: 1C **[NRML Back 1C]**	13 µA	1 to 50 µA	1	Yes	
02-310-19	Image area: Normal paper, back side: 2C **[NRML Back 2C]**	7 µA	1 to 50 µA	1	Yes	
02-310-20	Image area: Normal paper, back side: 3C **[NRML Back 3C]**	7 µA	1 to 50 µA	1	Yes	
02-310-21	Image area: Normal paper, back side: 4C **[NRML Back 4C]**	7 µA	1 to 50 µA	1	Yes	
02-310-22	Image area: Thick paper: back side: 1C **[THICK Back 1C]**	6 µA	1 to 50 µA	1	Yes	
02-310-23	Image area: Thick paper: back side: 2C **[THICK Back 2C]**	7 µA	1 to 50 µA	1	Yes	
02-310-24	Image area: Thick paper: back side: 3C **[THICK Back 3C]**	7 µA	1 to 50 µA	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-310-25	Image area: Thick paper: back side: 4C **[THICK Back 4C]**	7 µA	1 to 50 µA	1	Yes	Adjusts the paper transfer belt bias for various paper types and modes. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B) Adjust only if there are problems with insufficient transfer in the image area of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff.
02-310-26	Image area: 2/3 speed: back side: 1C **[NRML_2/3 Back 1C]**	13 µA	1 to 50 µA	1	Yes	
02-310-27	Image area: 2/3 speed: back side: 2C **[NRML_2/3 Back 2C]**	7 µA	1 to 50 µA	1	Yes	
02-310-28	Image area: 2/3 speed: back side: 3C **[NRML_2/3 Back 3C]**	7 µA	1 to 50 µA	1	Yes	
02-310-29	Image area: 2/3 speed: back side: 4C **[NRML_2/3 Back 4C]**	7µA	1 to 50 µA	1	Yes	
02-311: **[Forced Belt Cleaning]**						
02-311-00	Lubricant application			0: OFF 1: ON	-	Lubricates the image transfer belt. Do this when a partially blank printout occurs.
02-313: Paper transfer paper size correction **[P.T.B.: Paper Size Correction]**						
02-313-01	Normal paper: LT Sideways or larger **[NRML over LT Sideways]**	100%	10 to 400%	1		Paper transfer bias correction factors for various paper types and sizes. Adjust only if there are problems with insufficient transfer for a particular paper type, or in response to field problems as directed by technical support staff.
02-313-02	Normal paper: B4 or larger **[NRML over B4]**	100%	10 to 400%	1		
02-313-03	Normal paper: A4 Lengthwise or larger **[NRML over A5 Lengthwise]**	200%	10 to 400%	1		
02-313-04	Normal paper: Less than A4 Lengthwise **[NRML uner A5 Lengthwise]**	250%	10 to 400%	1		
02-313-05	Thick paper: LT Sideways or larger **[THICK over LT Sideways]**	100%	10 to 400%	1		
02-313-06	Thick paper: B4 or larger **[THICK over B4]**	100%	10 to 400%	1		
02-313-07	Thick paper: A4 Lengthwise or larger **[THICK over A5 Lengthwise]**	100%	10 to 400%	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-313-08	Thick paper: Less than A4 Lengthwise **[THICK under A5 Lengthwise]**	100%	10 to 400%	1		Paper transfer bias correction factors for various paper types and sizes. Adjust only if there are problems with insufficient transfer for a particular paper type, or in response to field problems as directed by technical support staff.
02-313-09	OHP:LT Sideways or larger **[OHP over LT Sideways]**	100%	10 to 400%	1		
02-313-10	OHP:B4 or larger **[OHP over B4]**	100%	10 to 400%	1		
02-313-11	OHP:A4 Lengthwise or larger **[OHP over A5 Lengthwise]**	200%	10 to 400%	1		
02-313-12	OHP: Less than A4 Lengthwise **[OHP under A5 Lengthwise]**	100%	10 to 400%	1		
02-314: Paper transfer leading edge area correction **[Paper Trans Bias: Leading Edge]**						
02-314-01	Normal paper: 1C **[NRML 1C]**	0 µA	-20 to 40 µA	1	Yes	For the paper leading edge, this correction value is added to the paper transfer image area setting. Adjust only if there are problems with insufficient transfer at the leading edge of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B)
02-314-02	Normal paper: 2C **[NRML 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-03	Normal paper: 3C **[NRML 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-04	Normal paper: 4C **[NRML 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-05	Thick paper: 1C **[THICK 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-06	Thick paper: 2C **[THICK 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-07	Thick paper: 3C **[THICK 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-08	Thick paper: 4C **[THICK 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-09	OHP: 1C **[OHP 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-10	OHP: 2C **[OHP 2C]**	0 µA	-20 to 40 µA	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-314-11	OHP: 3C **[OHP: 3C]**	0 µA	-20 to 40 µA	1	Yes	For the paper leading edge, this correction value is added to the paper transfer image area setting. Adjust only if there are problems with insufficient transfer at the leading edge of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B)
02-314-12	OHP: 4C **[OHP: 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-13	2/3 speed: 1C **[NRML_2/3 1C]**	3 µA	-20 to 40 µA	1	Yes	
02-314-14	2/3 speed: 2C **[NRML_2/3 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-15	2/3 speed: 3C **[NRML_2/3 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-16	2/3 speed: 4C **[NRML_2/3 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-17	Normal paper: back side: 1C **[NRML Back 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-18	Normal paper: back side: 2C **[NRML Back 2C]**	2 µA	-20 to 40 µA	1	Yes	
02-314-19	Normal paper: back side: 3C **[NRML Back 3C]**	2 µA	-20 to 40 µA	1	Yes	
02-314-20	Normal paper: back side: 4C **[NRML Back 4C]**	2 µA	-20 to 40 µA	1	Yes	
02-314-21	Thick paper: back side: 1C **[THICK Back 1C]**	2 µA	-20 to 40 µA	1	Yes	
02-314-22	Thick paper: back side: 2C **[THICK Back 2C]**	4 µA	-20 to 40 µA	1	Yes	
02-314-23	Thick paper: back side: 3C **[THICK Back 3C]**	4 µA	-20 to 40 µA	1	Yes	
02-314-24	Thick paper: back side: 4C **[THICK Back 4C]**	4 µA	-20 to 40 µA	1	Yes	
02-314-25	2/3 speed: back side: 1C **[NRML_2/3 Back 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-314-26	2/3 speed: back side: 2C **[NRML_2/3 Back 2C]**	0 µA	-20 to 40 µA	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-314-27	2/3 speed: back side: 3C **[NRML_2/3 Back 3C]**	0 µA	-20 to 40 µA	1	Yes	For the paper leading edge, this correction value is added to the paper transfer image area setting. Adjust only if there are problems with insufficient transfer at the leading edge of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B)
02-314-28	2/3 speed: back side: 4C **[NRML_2/3 Back 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-315: Paper transfer trailing edge correction **[Paper Trans Bias: Trail Edge]**						
02-315-01	Normal paper: 1C **[NRML 1C]**	3 µA	-20 to 40 µA	1	Yes	For the paper trailing edge, this correction value is added to the paper transfer image area setting. Adjust only if there are problems with insufficient transfer at the trailing edge of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B)
02-315-02	Normal paper: 2C **[NRML 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-03	Normal paper: 3C **[NRML 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-04	Normal paper: 4C **[NRML 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-05	Thick paper: 1C **[THICK 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-06	Thick paper: 2C **[THICK 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-07	Thick paper: 3C **[THICK 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-08	Thick paper: 4C **[THICK 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-09	OHP: 1C **[OHP 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-10	OHP: 2C **[OHP 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-11	OHP: 3C **[OHP 3C]**	0 µA	-20 to 40 µA	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-315-12	OHP: 4C **[OHP 4C]**	0 µA	-20 to 40 µA	1	Yes	For the paper trailing edge, this correction value is added to the paper transfer image area setting. Adjust only if there are problems with insufficient transfer at the trailing edge of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B)
02-315-13	2/3 speed: 1C **[NRML_2/3 1C]**	3 µA	-20 to 40 µA	1	Yes	
02-315-14	2/3 speed: 2C **[NRML_2/3 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-15	2/3 speed: 3C **[NRML_2/3 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-16	2/3 speed: 4C **[NRML_2/3 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-17	Normal paper: back side: 1C **[NRML Back 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-18	Normal paper: back side: 2C **[NRML Back 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-19	Normal paper: back side: 3C **[NRML Back 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-20	Normal paper: back side: 4C **[NRML Back 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-21	Thick paper: back side: 1C **[THICK Back 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-22	Thick paper: back side: 2C **[THICK Back 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-23	Thick paper: back side: 3C **[THICK Back 3C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-24	Thick paper: back side: 4C **[THICK Back 4C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-25	2/3 speed: back side: 1C **[NRML_2/3 Back 1C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-26	2/3 speed: back side: 2C **[NRML_2/3 Back 2C]**	0 µA	-20 to 40 µA	1	Yes	
02-315-27	2/3 speed: back side: 3C **[NRML_2/3 Back 3C]**	0 µA	-20 to 40 µA	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-315-28	2/3 speed: back side: 4C **[NRML_2/3 Back 4C]**	0 µA	-20 to 40 µA	1	Yes	For the paper trailing edge, this correction value is added to the paper transfer image area setting. Adjust only if there are problems with insufficient transfer at the trailing edge of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. 3C mode: Used in twin colour modes (Bk/R, Bk/G, or Bk/B)
02-316: Paper transfer bias: environmental correction **[P.T.B.Correction:Humidity]**						
02-316-01	**[Low-Hum NRML 1C]**	100	10 to 400			Corrects the paper transfer belt bias for the type of paper and copy mode depending on the humidity. Adjust if there are transfer problems for all modes in a certain humidity condition. These settings are used in conjunction with SP 2-310-1. 2/3 speed: Printer mode
02-316-02	**[Low-Hum NRML 4C]**	89	10 to 400			
02-316-03	**[Low-Hum THICK 1C]**	100	10 to 400			
02-316-04	**[Low-Hum THICK 4C]**	100	10 to 400			
02-316-05	**[Low-Hum OHP 1C]**	70	10 to 400			
02-316-06	**[Low-Hum OHP 4C]**	80	10 to 400			
02-316-07	**[Low-Hum NRML_2/3 1C]**	100	10 to 400			
02-316-08	**[Low-Hum NRML_2/3 4C]**	89	10 to 400			
02-316-09	**[Low-Hum NRML Back 1C]**	100	10 to 400			
02-316-10	**[Low-Hum NRML Back 4C]**	87	10 to 400			
02-316-11	**[Low-Hum THICK Back 1C]**	100	10 to 400			
02-316-12	**[Low-Hum THICK Back 4C]**	100	10 to 400			
02-316-13	**[Low-Hum NRML_2/3 Back 1C]**	120	10 to 400			
02-316-14	**[Low-Hum NRML_2/3 Back 4C]**	87	10 to 400			
02-316-21	**[High-Hum NRML 1C]**	100	10 to 400			
02-316-22	**[High-Hum NRML 4C]**	100	10 to 400			
02-316-23	**[High-Hum THICK 1C]**	100	10 to 400			
02-316-24	**[High-Hum THICK 4C]**	100	10 to 400			
02-316-25	**[High-Hum OHP 1C]**	100	10 to 400			
02-316-26	**[High-Hum OHP 4C]**	100	10 to 400			
02-316-27	**[High-Hum NRML_2/3 1C]**	100	10 to 400			

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-316-28	**[High-Hum NRML_2/3 4C]**	100	10 to 400			Corrects the paper transfer belt bias for the type of paper and copy mode depending on the humidity. Adjust if there are transfer problems for all modes in a certain humidity condition. These settings are used in conjunction with SP 2-310-1. 2/3 speed: Printer mode
02-316-29	**[High-Hum NRML Back 1C]**	100	10 to 400			
02-316-30	**[High-Hum NRML Back 4C]**	100	10 to 400			
02-316-31	**[High-Hum NRML THICK Back 1C]**	100	10 to 400			
02-316-32	**[High-Hum NRML THICK Back 4C]**	100	10 to 400			
02-316-33	**[High-Hum NRML_2/3 Back 1C]**	100	10 to 400			
02-316-34	**[High-Hum NRML_2/3 Back 4C]**	100	10 to 400			
02-912: Temperature and Humidity Display:**[Temperature Display]**						
02-912-01	**[Temperature]**			0,1		Displays the temperature currently detected by the temperature sensor.
02-912-02	**[Humidity]**			0,1		Displays the relative humidity currently detected by the humidity sensor.
02-913: Used toner sensor presence/absence **[Toner Overflow Sensor]**						
02-913-00	**[1:Sensor On, 0: Sensor Off]**	1	0: No sensor 1: Sensor present		Yes	Sets the presence or absence of the used toner sensor.
02-920: Resolution: Printer Mode, Test Patterns only **[Resolution: Printer Mode]**						
02-920-00	Printer mode resolution **[0: 400dpi, 1: 600dpi]**	0	0 to 1			Set this to 1 to generate the 600 DPI test patterns for the printer. 0 = 400 DPI (default); 1 = 600 DPI
02-951: **[Toner End Detection]**						
02-951-00	**[0: Detection, 1: No Detection]**	0	0: Detected 1: Not detected	1		Enables/disables the toner end detection function for all colors. Note: Reenter 0 after temporarily resetting this mode.
02-953: Maximum supply ratio **[Max Toner Recovery Ratio]**						
02-953-01	**[K]**	100%	0 to 100%	1		Adjusts the maximum toner supply ratio in the fuzzy supply mode.
02-953-02	**[Color]**	100%	0 to 100%	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
02-955: Method of detecting the transition from toner near-end to toner end **[Toner End Detection Count]**						
02-955-00	0: Pixel count and number of pages 1: Number of pages only	0	0 or 1	1		Selects the method for determining the number of copies which can be made between toner near-end and toner end. 0 = Determined by monitoring both the image coverage ratio (number of pixels) and the number of copies. 1 = Number of copies only
2-999: **[Belt Cleaning Release]**						
2-999-00	**[1: Release]**	0	0 to 1	1		This separates the cleaning blade and entrance seal from the belt, using the fusing motor and belt cleaning clutch.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
3. Process control system [Process]						
03-103: **[Vsp Display]**						
03-103-01	**[K]**	V	to V	0.01	Yes	Displays VSP for the ID sensor pattern just developed
03-103-02	**[C]**	V	to V	0.01	Yes	
03-103-03	**[M]**	V	to V	0.01	Yes	
03-103-04	**[Y]**	V	to V	0.01	Yes	
03-107: **[VSG Display]**						
03-107-001	**[K]**			0.01		Display VSG just measured from the bare drum
03-107-002	**[Color]**			0.01		
03-111: Residual Voltage **[Residual Voltage]**						
03-111-00	Residual potential display **[Vr]**	V	to V	1		Shows the residual potential measured on the drum during the most recent control.
03-122: Most recent value of VK **[Vk]**						
03-122-01	**[K]**					Displays the most recent values of VK for each colour. VK is a calculated approximation of the OPC voltage below which toner does not transfer to the latent image. Do not confuse this with VD, VG, or VL.
03-122-02	**[C]**					
03-122-03	**[M]**					
03-122-04	**[Y]**					

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
03-125: Process control method **[Potential Control]**						
03-125-00	Process control method **[0:Auto. 1:FIX, 2:Auto+2/3 Spd]**	0	0 to 2	1	Yes	Specifies whether process control is to be executed. 0: Automatic - process control enabled (keep the machine at this setting in normal cases) 1: Fixed Grid voltage VG, development bias VB, and max LD power are all fixed values 2: Process control done at 2/3 speed, for printer mode.
03-126: Forced Process Control Self Check **[Forced P-Ctrl Self Chk]**						
03-126-01	Self check: Execute		0 to 1	1		Does the forced process control self check. See SP 3-975 for the results.
03-127: Target maximum toner M/A for process control gamma correction **[P-control gamma target]**						
03-127-01	**[Max M/A: K]**	0.7mg/cm^2	0.5 to 1.5mg/cm^2	0.001	Yes	Adjusts the toner M/A target that is used for the maximum in the process control gamma correction.
03-127-02	**[Max M/A: Color]**	0.7mg/cm^2	0.5 to 1.5mg/cm^2	0.001	Yes	Do not adjust unless directed by technical support staff.
03-128: Toner Density Correction **[Toner Density Auto Control]**						
03-128-00	Toner density automatic correction **[0: ON, 1: OFF]**	0	0 to 1	1		Do not change the factory setting unless otherwise directed by technical support staff..
03-129: ID sensor pattern target toner M/A (toner supply control) **[ID sensor Pattern Target]**						
03-129-01	**[M/Aref: K]**	0.3mg/cm^2	0.100 to 1.500 mg/cm^2	0.001		Adjusts the target toner M/A on the ID sensor pattern during toner supply control. Do not adjust unless directed by technical support staff.
03-129-02	**[M/Aref: Color]**	0.4mg/cm^2		0.001		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
03-902: Current pointer table row number **[Pointer Table No]**						
03-902-01	**[K]**	mg/cm^2	to mg/cm^2	0.001		Displays the pointer table row number (to determine VD, VB, and VL) selected during the latest process control self-check.
03-902-02	**[C]**	mg/cm^2	to mg/cm^2	0.001		
03-902-03	**[M]**	mg/cm^2	to mg/cm^2	0.001		
03-902-04	**[Y]**	mg/cm^2	to mg/cm^2	0.001		
03-907: ID sensor pattern toner M/A display **[ID Sensor Pattern M/A Display]**						
03-907-01	**[K]**	mg/cm^2	to mg/cm^2	0.001	Yes	Displays the most recently detected ID sensor pattern M/A for each colour.
03-907-02	**[C]**	mg/cm^2	to mg/cm^2	0.001	Yes	
03-907-03	**[M]**	mg/cm^2	to mg/cm^2	0.001	Yes	
03-907-04	**[Y]**	mg/cm^2	to mg/cm^2	0.001	Yes	
3-964: Developer Initialization Result **[Dev.Agitation Result]**						
3-964-00	**[bResAging]**		0 to 999	1		1: Success Others: Failure See the troubleshooting section for details.
3-972: Process control self-check interval (hours) **[Auto P-control Interval]**						
3-972-00	**[Timer]**		0 to 24 hours			Adjusts the timed process control self-check interval. If 0 is selected, this type of process control self check is not done.
03-973: Process control self-check interval (pages) **[P-Ctrl Self Chk Interval]**						
03-973-00	**[Sheets]**	150 pages	0 to 200 pages	1	Yes	Adjusts the process control self-check interval. If 0 is selected, this type of process control self check is not done.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
03-974: Maximum target toner amount **[Potential Control Target]**						
03-974-01	**[Max M/A: K]**	0.7mg/cm^2	0.5 to 1.5mg/cm^2	0.001	Yes	Sets the target toner M/A maximum to be used during process control when calculating the development potential (corresponding to the amount of toner in a solid area). Do not adjust unless directed by technical support staff.
03-974-02	**[Max M/A: Color]**	0.7mg/cm^2	0.5 to 1.5mg/cm^2	0.001	Yes	
3-975: Process Control Self Check Result **[P-Ctrl Self Chk Result]**						
3-975-00	**[bResSlfChk]**		0 to 999	1		1: Success Others: Failure See the troubleshooting section for details.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
4. Scanner						
04-008: Sub-scan Magnification **[Subscan Magnification]**						
04-008-00	Scanner sub-scan magnification adjustment **[Subscan Magnification]**	0%	-1.0 to 1.0%	0.1	Yes	Adjusts the magnification of the scanned image in the feed direction. This adjusts the scanner motor speed.
04-010: Scanner leading edge registration adjustment **[Lead Edge Regist: Scanning]**						
04-010-00	**[Lead Edge Regist: Scanning]**	0 mm	-5.0 to 5.0 mm	0.1	Yes	Adjusts the leading edge registration by changing the laser exposure start timing in the sub-scan direction.
04-011: Scanner side-to-side registration adjustment **[Sd to Sd Regist: Scanng]**						
04-011-00	**[Side to Side Regist: Scanning]**	0 mm	-6.0 to 6.0 mm	0.1	Yes	Adjusts the side-to-side registration by changing the laser exposure start timing in the main scan direction.
04-012: Scanner blank margin adjustment **[Blnk Mrgn]**						
04-012-01	**[Rear]**	0 mm	0 to 3.0 mm	0.1		Sets the blank margin at each side for erasing the original shadow caused by the gap between the original and scale..
04-012-02	**[Front]**	0 mm	0 to 3.0 mm	0.1		
04-012-03	**[Left]**	0 mm	0 to 3.0 mm	0.1		
04-012-04	**[Right]**	0 mm	0 to 3.0 mm	0.1		
04-013: Scanner free run **[Scanner Free Run]**						
04-013-01	Lamp on **[Lamp ON]**		1: Start 0: Stop			Repeats the reciprocal movement of the carriage on the scanner alone. The speed is for 100%.
04-013-02	Lamp off **[Lamp OFF]**					
04-301: APS operation test **[Scanner Free Run]**						
04-301-00	APS operation test: Size display **[APS Data Confirmation]**		to			Shows the width of the original detected by the original width and length sensors.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-303: APS minimum size setting **[APS Minimum size setting]**						
04-303-00	**[0: Out of detection, 1: A5 L]**	0	0 to 1	1		Specifies whether the original width is to be recognized as A5/HLT portrait when the original width sensor outputs are all set to OFF (A5R or smaller, or no original) in platen mode. If this SP is at 0, no size is detected.
04-417: IPU Test Ptrn Selection **[IPU Test Ptrn Selection]**						
04-417-00	IPU test pattern setup **[IPU Test Ptrn Selection]**	0	0 to 14	1		0 = No pattern (normal copy operation mode) 1 = Grid pattern 2 = Slanted Grid Pattern 3 = 256 gradation (Horizontal) 4 = 256 gradation (Vertical) 5 = Color patch 6 = RGB gray scale (16 gradation steps) 7 = YMCK-RGB 16 gradation 8 = YMCK 16 gradation 9 = YMCH 128 gradation 10 = Same as 1 11 = Same as 8 12 = Same as 9 13 = YMCK-RGB 16 gradation 14 = YMCK 128 gradation I."
04-426: RGB gain setup **[RGB_GAIN]**						
04-426-01	**[R_GAIN ODD]**	0	0 to 255	1	Yes	Sets or displays the gain value of the amplifiers on the scanner IPU for odd and even pixels for each RGB color. Do not adjust the factory settings.
04-426-02	**[R_GAIN EVEN]**	0	0 to 255	1	Yes	
04-426-03	**[G_GAIN ODD]**	0	0 to 255	1	Yes	
04-426-04	**[G_GAIN EVEN]**	0	0 to 255	1	Yes	
04-426-05	**[B_GAIN ODD]**	0	0 to 255	1	Yes	
04-426-06	**[B_GAIN EVEN]**	0	0 to 255	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-427: RGB reference setup **[RGB REF]**						
04-427-01	R: 0 **[R_REF0]**					Sets or displays the reference voltage for the A/D converters on the scanner IPU for each RGB color. Do not adjust the factory settings.
04-427-02	G: 0 **[G_REF0]**					
04-427-03	B: 0 **[B_REF0]**					
04-427-04	R: 1 **[R_REF1]**	160	0 to 255	1	Yes	
04-427-05	G: 1 **[G_REF1]**	160	0 to 255	1	Yes	
04-427-06	B: 1 **[B_REF1]**	160	0 to 255	1	Yes	
04-435: **[White Level Adj.]**						
04-435-00	**[White Level Adjustment]**		1: Start	1		Performs the white level adjustment..
04-500: ACC object selection **[ACC Target Selection]**						
04-500-00	**[ACC Mode Selection]**					Do not adjust this setting. To adjust this, use the user tools.
04-501: ACC target **[ACC Target Adjustment: Copier]**						
04-501-01	**[Copier: Text: K]**	5	0 to 50	1	Yes	Adjusts the ACC targets for text and photo mode in copy mode See 'Replacement and Adjustment – Copy Image Adjustment – ACC Target Adjustment' for how to use these SP modes. ACC (Automatic Color Calibration)
04-501-02	**[Copier: Text: C]**	5	0 to 50	1	Yes	
04-501-03	**[Copier: Text: M]**	5	0 to 50	1	Yes	
04-501-04	**[Copier: Text: Y]**	5	0 to 50	1	Yes	
04-501-05	**[Copier: Photo: K]**	5	0 to 50	1	Yes	
04-501-06	**[Copier: Photo: C]**	5	0 to 50	1	Yes	
04-501-07	**[Copier: Photo: M]**	5	0 to 50	1	Yes	
04-501-08	**[Copier: Photo: Y]**	5	0 to 50	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-502: ACC target **[ACC Target Adjustment: Printer]**						
04-502-01	Printer mode, text/photo, K **[Printer: Text: K]**	5	0 to 50	1	Yes	Adjusts the ACC targets for text and photo mode in printer mode See 'Replacement and Adjustment – Copy Image Adjustment – ACC Target Adjustment' for how to use these SP modes. ACC (Automatic Color Calibration) SP 4-502-05 to 08 are not used.
04-502-02	Printer mode, text/photo, C **[Printer: Text: C]**	5	0 to 50	1	Yes	
04-502-03	Printer mode, text/photo, M **[Printer: Text: M]**	5	0 to 50	1	Yes	
04-502-04	Printer mode, text/photo, Y **[Printer: Text: Y]**	5	0 to 50	1	Yes	
04-502-05	**[Printer: Photo: K]**	5	0 to 50	1	Yes	
04-502-06	**[Printer: Photo: C]**	5	0 to 50	1	Yes	
04-502-07	**[Printer: Photo: M]**	5	0 to 50	1	Yes	Adjusts the ACC targets for text and photo mode in printer mode See 'Replacement and Adjustment – Copy Image Adjustment – ACC Target Adjustment' for how to use these SP modes. ACC (Automatic Color Calibration) SP 4-502-05 to 08 are not used.
04-502-08	**[Printer: Photo: Y]**	5	0 to 50	1	Yes	
04-503: ACC target: Printer 2 **[ACC Target Adjustment: Printer]**						
04-503-01	**[Printer2: Text: K]**					Printer 2 is not used in this machine. Do not adjust these SP modes.
04-503-02	**[Printer2: Text: C]**					
04-503-03	**[Printer2: Text: M]**					
04-503-04	**[Printer2: Text: Y]**					
04-503-05	**[Printer2: Photo: K]**					
04-503-06	**[Printer2: Photo: M]**					
04-503-07	**[Printer2: Photo: M]**					
04-503-08	**[Printer2: Photo: Y]**					

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-505: ACC machine difference correction value, light areas **[ACC Device Correction: HL]**						
04-505-01	**[K]**	0	-128 to 127	1		Adjusts the machine difference correction value for low ID areas during ACC. These are factory adjustments. Do not adjust in the field.
04-505-02	**[C]**	0	-128 to 127	1		
04-505-03	**[M]**	0	-128 to 127	1		
04-505-04	**[Y]**	0	-128 to 127	1		
04-506: ACC machine difference correction value, dark areas **[ACC Device Correction: Shadow]**						
04-506-01	K **[Shadow: K]**	0	-128 to 127	1		Adjusts the machine difference correction value for high ID areas during ACC. These are factory adjustments. Do not adjust in the field.
04-506-02	C **[Shadow: C]**	0	-128 to 127	1		
04-506-03	M **[Shadow: M]**	0	-128 to 127	1		
04-506-04	Y **[Shadow: Y]**	0	-128 to 127	1		
04-520: Manual gamma adjustment, printer 2, letter, K **[Manual gamma Adj: Printer2: K]**						
04-520-01	**[Low ID (Offset)]**	15	0 to 30	1		Printer 2 is not used in this machine. Do not adjust these SP modes.
04-520-02	**[Middle ID (Offset)]**	15	0 to 30	1		
04-520-03	**[High ID (Offset)]**	15	0 to 30	1		
04-520-04	**[ID max (Offset)]**	15	0 to 30	1		
04-520-05	**[Low ID (Option)]**	0	0 to 30	1		
04-520-06	**[Middle ID (Option)]**	0	0 to 30	1		
04-520-07	**[High ID (Option)]**	0	0 to 30	1		
04-520-08	**[ID max (Option)]**	0	0 to 30	1		
04-521: Manual gamma Adj: Printer 2: C **[Manual gamma Adj: Printer2: C]**						
04-521-01	**[Low ID (Offset)]**	15	0 to 30			Printer 2 is not used in this machine. Do not adjust these SP modes.
04-521-02	**[Middle ID (Offset)]**	15	0 to 30			
04-521-03	**[High ID (Offset)]**	15	0 to 30			
04-521-04	**[ID max (Offset)**	15	0 to 30			

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-521-05	**[Low ID (Option)]**	0	0 to 30			Printer 2 is not used in this machine. Do not adjust these SP modes.
04-521-06	**[Middle ID (Option)]**	0	0 to 30			
04-521-07	**[High ID (Option)]**	0	0 to 30			
04-521-08	**ID max (Option)]**	0	0 to 30			
04-522: Manual gamma Adj: Printer 2: M **[Manual gamma Adj: Printer2: M]**						
04-522-01	**[Low ID (Offset)]**	15	0 to 30			Printer 2 is not used in this machine. Do not adjust these SP modes.
04-522-02	**[Middle ID (Offset)]**	15	0 to 30			
04-522-03	**[High ID (Offset)]**	15	0 to 30			
04-522-04	**[ID max (Offset)]**	15	0 to 30			
04-522-05	**[Low ID (Option)]**	0	0 to 30			
04-522-06	**[Middle ID (Option)]**	0	0 to 30			
04-522-07	**[High ID (Option)]**	0	0 to 30			
04-522-08	**[ID max (Option)]**	0	0 to 30			
04-523: Manual gamma Adj: Printer 2: Y **[Manual gamma Adj: Printer2: Y]**						
04-523-01	**[Low ID (Offset)]**	15	0 to 30			Printer 2 is not used in this machine. Do not adjust these SP modes.
04-523-02	**[Middle ID (Offset)]**	15	0 to 30			
04-523-03	**[High ID (Offset)]**	15	0 to 30			
04-523-04	**[ID max (Offset)]**	15	0 to 30			
04-523-05	**[Low ID (Option)]**	0	0 to 30			
04-523-06	**[Middle ID (Option)]**	0	0 to 30			
04-523-07	**[High ID (Option)]**	0	0 to 30			
04-523-08	**[ID max (Option)]**	0	0 to 30			

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-904	Scanner IPU board tests **[IPU Board Test]**					Selects the CCD output and internal test pattern outputs.
04-904-01	Scanner IPU board test 1 **[Test1]**		0 to 0x17	1		Tests the scanner IPU board. 0: OK Others: Defective
04-904-02	Scanner IPU board test 2 **[Test2]**		0 to 0x2A	1		
04-907: VPU Test Pattern Selection **[VPU Test Ptrn Selection]**						
04-907-00	VPU Test pattern select **[VPU Test Ptrn Selection]**	0	0 to 5	1		Selects the CCD output and internal test patterns. The analog video ASIC makes test patterns 1 to 5 for this SP mode. 0: CCD output, 1: Black pattern, 2: White pattern, 3: 16-gradation pattern, 4: 4-dot grid pattern, 5: 2-dot grid pattern
04-910: Manual gamma adjustment: Copy: Letter K **[Manual gamma Adj: Copier: k]**						
04-910-01	Offset (low ID) **[Low ID (Offset): Text]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for black toner (full colour mode) in letter mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-910-02	Offset (Middle ID) **[Middle ID (Offset): Text]**	15	0 to 30	1	Yes	
04-910-03	Offset (High ID) **[High ID (Offset) Text]**	15	0 to 30	1	Yes	
04-910-04	Offset (ID max) **[ID max (Offset) Text]**	15	0 to 30	1	Yes	
04-910-05	Option (low ID) **[Low ID (Option) Text]**	0	0 to 30	1	Yes	
04-910-06	Option (Middle ID) **[Middle ID (Option) Text]**	0	0 to 30	1	Yes	
04-910-07	Option (High ID) **[High ID (Option) Text]**	0	0 to 30	1	Yes	
04-910-08	Option (ID max) **[ID max (Option) Text]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-911: Manual gamma adjustment: Copy: Letter C **[Manual gamma Adj: Copier: C]**						
04-911-01	Offset (low ID) **[Low ID (Offset): Text]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for cyan toner in letter mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-911-02	Offset (Middle ID) **[Middle ID (Offset): Text]**	15	0 to 30	1	Yes	
04-911-03	Offset (High ID) **[High ID (Offset) Text]**	15	0 to 30	1	Yes	
04-911-04	Offset (ID max) **[ID max (Offset) Text]**	15	0 to 30	1	Yes	
04-911-05	Option (low ID) **[Low ID (Option) Text]**	0	0 to 30	1	Yes	
04-911-06	Option (Middle ID) **[Middle ID (Option) Text]**	0	0 to 30	1	Yes	
04-911-07	Option (High ID) **[High ID (Option) Text]**	0	0 to 30	1	Yes	
04-911-08	Option (ID max) **[ID max (Option) Text]**	0	0 to 30	1	Yes	
04-912: Manual gamma adjustment: Copy: Letter M **[Manual gamma Adj: Copier: M]**						
04-912-01	Offset (low ID) **[Low ID (Offset): Text]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for magenta toner in letter mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-912-02	Offset (Middle ID) **[Middle ID (Offset): Text]**	15	0 to 30	1	Yes	
04-912-03	Offset (High ID) **[High ID (Offset) Text]**	15	0 to 30	1	Yes	
04-912-04	Offset (ID max) **[ID max (Offset) Text]**	15	0 to 30	1	Yes	
04-912-05	Option (low ID) **[Low ID (Option) Text]**	0	0 to 30	1	Yes	
04-912-06	Option (Middle ID) **[Middle ID (Option) Text]**	0	0 to 30	1	Yes	
04-912-07	Option (High ID) **[High ID (Option) Text]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-912-08	Option (ID max) **[ID max (Option) Text]**	0	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for magenta toner in letter mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-913: Manual gamma adjustment: Copy: Letter Y **[Manual gamma Adj: Copier: Y]**						
04-913-01	Offset (low ID) **[Low ID (Offset): Text]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for yellow toner in letter mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-913-02	Offset (Middle ID) **[Middle ID (Offset): Text]**	15	0 to 30	1	Yes	
04-913-03	Offset (High ID) **[High ID (Offset) Text]**	15	0 to 30	1	Yes	
04-913-04	Offset (ID max) **[ID max (Offset) Text]**	15	0 to 30	1	Yes	
04-913-05	Option (low ID) **[Low ID (Option) Text]**	0	0 to 30	1	Yes	
04-913-06	Option (Middle ID) **[Middle ID (Option) Text]**	0	0 to 30	1	Yes	
04-913-07	Option (High ID) **[High ID (Option) Text]**	0	0 to 30	1	Yes	
04-913-08	Option (ID max) **[ID max (Option) Text]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-914: Manual gamma adjustment: Copy: Letter, single color K **[Manual gamma Adj: Copier: SC K]**						
04-914-01	Offset (low ID) **[Low ID (Offset): Text]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for black toner (single colour mode) in letter mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-914-02	Offset (Middle ID) **[Middle ID (Offset): Text]**	15	0 to 30	1	Yes	
04-914-03	Offset (High ID) **[High ID (Offset) Text]**	15	0 to 30	1	Yes	
04-914-04	Offset (ID max) **[ID max (Offset) Text]**	15	0 to 30	1	Yes	
04-914-05	Option (low ID) **[Low ID (Option) Text]**	0	0 to 30	1	Yes	
04-914-06	Option (Middle ID) **[Middle ID (Option) Text]**	0	0 to 30	1	Yes	
04-914-07	Option (High ID) **[High ID (Option) Text]**	0	0 to 30	1	Yes	
04-914-08	Option (ID max) **[ID max (Option) Text]**	0	0 to 30	1	Yes	
04-915: Manual gamma adjustment: Copy: Photo K **[Manual gamma Adj: Copier: k]**						
04-915-01	Offset (low ID) **[Low ID (Offset): Photo]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for black toner (full colour mode) in photo mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-915-02	Offset (Middle ID) **[Middle ID (Offset): Photo]**	15	0 to 30	1	Yes	
04-915-03	Offset (High ID) **[High ID (Offset) Photo]**	15	0 to 30	1	Yes	
04-915-04	Offset (ID max) **[ID max (Offset) Photo]**	15	0 to 30	1	Yes	
04-915-05	Option (low ID) **[Low ID (Option) Photo]**	0	0 to 30	1	Yes	
04-915-06	Option (Middle ID) **[Middle ID (Option) Photo]**	0	0 to 30	1	Yes	
04-915-07	Option (High ID) **[High ID (Option) Photo]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-915-08	Option (ID max) **[ID max (Option) Photo]**	0	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for black toner (full colour mode) in photo mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-916: Manual gamma adjustment: Copy: Photo C **[Manual gamma Adj: Copier: C]**						
04-916-01	Offset (low ID) **[Low ID (Offset): Photo]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for cyan toner in photo mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-916-02	Offset (Middle ID) **[Middle ID (Offset): Photo]**	15	0 to 30	1	Yes	
04-916-03	Offset (High ID) **[High ID (Offset) Photo]**	15	0 to 30	1	Yes	
04-916-04	Offset (ID max) **[ID max (Offset) Photo]**	15	0 to 30	1	Yes	
04-916-05	Option (low ID) **[Low ID (Option) Photo]**	0	0 to 30	1	Yes	
04-916-06	Option (Middle ID) **[Middle ID (Option) Photo]**	0	0 to 30	1	Yes	
04-916-07	Option (High ID) **[High ID (Option) Photo]**	0	0 to 30	1	Yes	
04-916-08	Option (ID max) **[ID max (Option) Photo]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-917: Manual gamma adjustment: Copy: Photo M **[Manual gamma Adj: Copier: M]**						
04-917-01	Offset (low ID) **[Low ID (Offset): Photo]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for magenta toner in photo mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-917-02	Offset (Middle ID) **[Middle ID (Offset): Photo]**	15	0 to 30	1	Yes	
04-917-03	Offset (High ID) **[High ID (Offset) Photo]**	15	0 to 30	1	Yes	
04-917-04	Offset (ID max) **[ID max (Offset) Photo]**	15	0 to 30	1	Yes	
04-917-05	Option (low ID) **[Low ID (Option) Photo]**	0	0 to 30	1	Yes	
04-917-06	Option (Middle ID) **[Middle ID (Option) Photo]**	0	0 to 30	1	Yes	
04-917-07	Option (High ID) **[High ID (Option) Photo]**	0	0 to 30	1	Yes	
04-917-08	Option (ID max) **[ID max (Option) Photo]**	0	0 to 30	1	Yes	
04-918: Manual gamma adjustment: Copy: Photo Y **[Manual gamma Adj: Copier: Y]**						
04-918-01	Offset (low ID) **[Low ID (Offset): Photo]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for yellow toner in photo mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-918-02	Offset (Middle ID) **[Middle ID (Offset): Photo]**	15	0 to 30	1	Yes	
04-918-03	Offset (High ID) **[High ID (Offset) Photo]**	15	0 to 30	1	Yes	
04-918-04	Offset (ID max) **[ID max (Offset) Photo]**	15	0 to 30	1	Yes	
04-918-05	Option (low ID) **[Low ID (Option) Photo]**	0	0 to 30	1	Yes	
04-918-06	Option (Middle ID) **[Middle ID (Option) Photo]**	0	0 to 30	1	Yes	
04-918-07	Option (High ID) **[High ID (Option) Photo]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-918-08	Option (ID max) **[ID max (Option) Photo]**	0	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for yellow toner in photo mode, using copy mode. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-919: Manual gamma adjustment: Printer: K **[Manual gamma Adj: Printer: K]**						
04-919-01	Offset (low ID) **[Low ID (Offset)]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for black toner (full colour mode) using printer mode (for both text and photo data). Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-919-02	Offset (Middle ID) **[Middle ID (Offset)]**	15	0 to 30	1	Yes	
04-919-03	Offset (High ID) **[High ID (Offset)]**	15	0 to 30	1	Yes	
04-919-04	Offset (ID max) **[ID max (Offset)]**	15	0 to 30	1	Yes	
04-919-05	Option (low ID) **[Low ID (Option)]**	0	0 to 30	1	Yes	
04-919-06	Option (Middle ID) **[Middle ID (Option)]**	0	0 to 30	1	Yes	
04-919-07	Option (High ID) **[High ID (Option)]**	0	0 to 30	1	Yes	
04-919-08	Option (ID max) **[ID max (Option)]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-920: Manual gamma adjustment: Printer: C **[Manual gamma Adj: Printer: C]**						
04-920-01	Offset (low ID) **[Low ID (Offset)]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for cyan toner, using printer mode (for both text and photo data).. Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-920-02	Offset (Middle ID) **[Middle ID (Offset)]**	15	0 to 30	1	Yes	
04-920-03	Offset (High ID) **[High ID (Offset)]**	15	0 to 30	1	Yes	
04-920-04	Offset (ID max) **[ID max (Offset)]**	15	0 to 30	1	Yes	
04-920-05	Option (low ID) **[Low ID (Option)]**	0	0 to 30	1	Yes	
04-920-06	Option (Middle ID) **[Middle ID (Option)]**	0	0 to 30	1	Yes	
04-920-07	Option (High ID) **[High ID (Option)]**	0	0 to 30	1	Yes	
04-920-08	Option (ID max) **[ID max (Option)]**	0	0 to 30	1	Yes	
04-921: Manual gamma adjustment: Printer: M **[Manual gamma Adj: Printer: M]**						
04-921-01	Offset (low ID) **[Low ID (Offset)]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for magenta toner using printer mode (for both text and photo data). Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-921-02	Offset (Middle ID) **[Middle ID (Offset)]**	15	0 to 30	1	Yes	
04-921-03	Offset (High ID) **[High ID (Offset)]**	15	0 to 30	1	Yes	
04-921-04	Offset (ID max) **[ID max (Offset)]**	15	0 to 30	1	Yes	
04-921-05	Option (low ID) **[Low ID (Option)]**	0	0 to 30	1	Yes	
04-921-06	Option (Middle ID) **[Middle ID (Option)]**	0	0 to 30	1	Yes	
04-921-07	Option (High ID) **[High ID (Option)]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-921-08	Option (ID max) **[ID max (Option)]**	0	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for magenta toner using printer mode (for both text and photo data). Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-922: Manual gamma adjustment: Printer Y **[Manual gamma Adj: Printer: Y]**						
04-922-01	Offset (low ID) **[Low ID (Offset)]**	15	0 to 30	1	Yes	Use these SPs to adjust the colour balance if the results of ACC are not satisfactory. This is for yellow toner using printer mode (for both text and photo data). Do not use the 'Option' settings. See 'Replacement and Adjustment – Copy Image Adjustment – Printer Gamma Adjustment' for how to use these SP modes. ACC (Automatic Colour Calibration)
04-922-02	Offset (Middle ID) **[Middle ID (Offset)]**	15	0 to 30	1	Yes	
04-922-03	Offset (High ID) **[High ID (Offset)]**	15	0 to 30	1	Yes	
04-922-04	Offset (ID max) **[ID max (Offset)]**	15	0 to 30	1	Yes	
04-922-05	Option (low ID) **[Low ID (Option)]**	0	0 to 30	1	Yes	
04-922-06	Option (Middle ID) **[Middle ID (Option)]**	0	0 to 30	1	Yes	
04-922-07	Option (High ID) **[High ID (Option)]**	0	0 to 30	1	Yes	
04-922-08	Option (ID max) **[ID max (Option)]**	0	0 to 30	1	Yes	

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
04-932: Main scan dot position correction **[Picture Element Correction]**						
04-932-01	**[Red: Left]**	5	0 to 9	1		Adjusts the left and right ends of the red and blue scan lines to align them with the green scan line. See 'Replacement and Adjustment – Copy Image Adjustment – Main Scan Position Dot Correction' for how to use these SP modes.
04-932-02	**[Red: Right]**	5	0 to 9	1		
04-932-03	**[Blue: Left]**	5	0 to 9	1		
04-932-04	**[Blue: Right]**	5	0 to 9	1		
04-980: **[FPU Reference setting]**						
04-980-01	**[Red: Positive]**	133	0 to 255	1		Adjusts or displays the reference value used in the A/D converter for RGB signals in the scanner analog processing circuit when the FPU is used. There is no need to use these SP modes with the FPU that is specified for use with the Iris/Lilac.
04-980-02	**[Green: Positive]**	133	0 to 255	1		
04-980-03	**[Blue: Positive]**	133	0 to 255	1		
04-980-04	**[Red: Negative]**	133	0 to 255	1		
04-980-05	**[Green: Negative]**	133	0 to 255	1		
04-980-06	**[Blue: Negative]**	133	0 to 255	1		
04-981: **[FPU White level Target]**						
04-981-01	**[Positive]**	568	0 to 1023	1		Shows or sets the target level of the reference white level for positive and negative film when the FPU is used. There is no need to use these SP modes with the FPU that is specified for use with the Iris/Lilac.
04-981-02	**[Negative]**	568	0 to 1023	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05. Operation mode/system [Mode]						
05-001-00	Operation panel all on **[0: OFF, 1: ON]**	0	0 to 1	1		Turns on all the indicators to test the operation panel display functions. 0 = Normal display; 1 = All on
05-009-01	Display language setup **[Disp Language]**	0	0 to 15	1		Defines the display language. 0 = Japanese; = 1 English; 2 = French; 3 = German; 4 = Spanish; 5 = Italian, etc (the others are listed in the Installation section of the manual).
05-009-02	Millimeter/inch selection **[mm or inchi]**	0	0 to 1	1		Selects metric or inches. 0 = metric 1 = inches This affects the available magnification ratios and the unit that is displayed when inputting values for directional size magnification. Available paper sizes and other features are not affected.
05-104: **[A3/DTL Double Count]**						
05-104-00	**[A3/DTL Double Count]**	0	0 to 1	1		Specifies whether the counter is doubled for A3/DLT size paper. 0 = Normal count, 1 = Double count
05-113-00	Key card/coin lock installation **[Key Card / Coin Lock]**	0	0 to 3	1		Specifies whether the key counter, key card, or coin lock is installed or not. 0 = None (default) 1 = Key card (used in Japan only) 2 = Key counter 3 = Coin lock (used in Japan only)
05-114-00	Account color mode setup **[Color Mode Selection: Key Card]**	F	1 to F			Bit 0 = 1: Managed in black mode Bit 1 = 1: Managed in single colour mode Bit 2 = 1: Managed in two colour mode Bit 3 = 1: Managed in full colour mode Used in Japan only.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05-120: Clear mode when key counter removed **[Clear Md On/Off: Key Counter]**						
05-120-00	**[Clear Md On/Off: Key Counter]**	1	0 to 1	1		Specifies whether the current mode is cleared or not when the key counter is removed. 0 = Mode not cleared, 1 = Mode cleared
05-121: Count up Timing: Key Card **[Count up Timing: Key Card]**						
05-121-00	Key card count-up timing **[Count up Timing: Key Card]**	1	0 to 1	1		Selects the counter update timing for the key card (used in Japan only) 0 = Paper feed-in, 1 = Paper feed-out
05-126: F size Paper **[F*size Paper]**						
05-126-00	F size selection **[0: F4, 1: F, 2: Folio]**					Determines which original size the machine detects when the APS sensors detect F size. 0 = F4 (8 1/2" x 13") 1 = F (8" x 13") 2 = Folio (8 1/4" x 13")
05-127: Feature Prohibition with Coin Lock **[Coin Lock Prohibition]**						
05-127-01	When coin lock used: APS enabled **[APS function]**	0	0 to 1	1		Specifies whether APS (Automatic Paper Select) is enabled when a coin lock is used. 0 = Disabled (default); 1 = Enabled Coin lock is used in Japan only.
05-127-02	When coin lock used: ACS enabled **[ACS function]**	0	0 to 1	1		Specifies whether ACS (Automatic Color Select) is enabled when a coin lock is used. 0 = Disabled (default); 1 = Enabled Coin lock is used in Japan only.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05-128: User Code + Coin Lock **[User Code + Coiun Lock]**						
05-128-00	**[User Code + Conie Lock]**	0	0 to 1			Selects whether both User Code and Coin Lock can be used. 0 = One of them only 1 = Both The coin lock is used in Japan only
05-410: Key operator code reset **[User Code Password Clear]**						
05-410-00	**[User Code Password Clear]**		0 to 1			Resets the key operator code. Use this when the user forgets the code.
05-501: Set PM Counter Interval **[Set PM Counter]**						
05-501-00	PM counter **[Set PM Counter]**	60000	0 to 999999	1		Sets the PM counter interval. 0: PM counter not used.
05-504: **[Jam Alarm Level]**						
05-504-00	**[Jam Alarm Level]**	1	0 to 3	1		Sets the jam alarm level (used in Japan only). 0 = Not used 1 = 250 sheets 2 = 500 sheets 3 = 1,000 sheets
05-505: **[SC Alarm Level]**						
05-505-00	**[SC Alarm Level]**	1	0 to 3	1		Sets the SC alarm level (used in Japan only). 0 = Not used 1 = 250 sheets 2 = 500 sheets 3 = 1,000 sheets

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05-507: SC Supply alarm setup: Copy count by size **[Alarm Level]**						
05-507-01	**[Toner End]**	0	0 to 1	1		Specifies whether supply alarm calls are to be made. This mode specifies whether supply calls are to be made according to the number of copies. Used in Japan only
05-507-02	Count of Copy		0 to 1	1		
05-507-03	Staple		0 to 1	1		
05-507-131	A2		0 to 1	1		
05-507-132	A3		0 to 1	1		
05-507-133	A4		0 to 1	1		
05-507-134	A5		0 to 1	1		
05-507-140	B3		0 to 1	1		
05-507-141	B4		0 to 1	1		
05-507-142	B5		0 to 1	1		
05-507-143	B6		0 to 1	1		
05-507-160	DLT		0 to 1	1		
05-507-164	LG		0 to 1	1		
05-507-166	LT		0 to 1	1		
05-508: **[EM Auto Call On/Off]**						
05-508-00	CC auto call setup **[EM Auto Call On/Off]**	1	0 to 1	1		Specifies whether CC auto calls are to be made. 0: No; 1: Yes Used in Japan only
5-609: Ink Jet mode selection **[Ink Jet mode selection]**						
5-609-00						Do not adjust this setting. To adjust the ink jet mode, use the user tools.
05-610: Recall/overwrite ACC factory settings **[ACC]**						
05-610-04	Recall factory settings **[Load: Factory Setting]**	0	0 to 1	1		Recalls the factory settings of the ACC values.
05-610-05	Overwrite factory settings **Save as factory setting]**	0	0 to 1	1		Overwrites the factory settings of the ACC values with the current values.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
5-611: Toner Ratios in 2C mode **[Toner Amount Ration in 2C]**						
5-611-01	**[Cyan in Blue]**	90				Determines the amounts of toner used to produce R, G, and B in 2C mode
5-611-02	**[Magenta in Blue]**	80				
5-611-03	**[Cyan in Green]**	90				
5-611-04	**[Yellow in Green]**	80				
5-611-05	**[Magenta in Red]**	100				
5-611-06	**[Yellow in Red]**	80				
5-612: **[Scanner gamma selection]**						
5-612-00						Not used in this machine.
05-801: **[RAM Clear]**						
05-801-01	NVRAM Clear **[NVRAM Clear]**		1: Clear			Returns the contents of the NV-RAM to the factory-settings. See 'Replacement and Adjustment – System and Electronics – RAM Clear' for details on using this SP mode.
05-802: **[Free Run]**						
05-802-1	**[Printer]**		0: Stop 1: Start			Printer: Printer only Scanner: Scanner and printer
05-802-2	**[System]**		0: Stop 1: Start			
05-803:Input tests **[INPUT Chk]**						
05-803	**[INPUT Chk]**					Refer to 'Service Tables – Input Check'.
05-804: Output tests **[OUTPUT Chk]**						
05-804-xx						Refer to 'Service Tables – Output Check'.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05-810: **[SC Reset]**						
05-810-00	**[SC Reset]**		0 to 1			Resets a type A service call condition, which is caused by the fusing section. 1 = Reset After resetting the SC code, the main switch has to be turned off and on.
05-811: **[Serial No.]**						
05-811-00						Displays the serial number
05-812: Service Telephone Number **[Service Tel.No.]**						
05-812-00						Inputs the telephone number of the service representative. (This number is displayed when a service call condition occurs.)
5-816: **[RDS On/Off]**						
5-816-00		0	0: OFF 1: ON			When the machine is connected to an RDS system, set this SP to “1” to enable the RDS functions.
5-817: **[Repair Time Tx]**						
5-817-00		-	0: End 1: Start			When using an RDS system, set this SP mode to 1 at the start of maintenance. Set it back to 0 after finishing maintenance.
05-824: NVRAM Upload **[NVRAM Up Load]**						
05-824-00	**[NVRAM Up Load]**		0 to 1			Uploads data from the NV-RAM to the IC card. See ‘Replacement & Adjustment – System & Electronics’.
05-825: NV-RAM download **[NVRAM Down Loa]**						
05-825-00	**[NVRAM Down Load]**		0 to 1			Downloads data from the IC card to the NV-RAM. See ‘Replacement & Adjustment – System & Electronics’.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05-827: Main program download **[Program Down Load]**						
05-827-00	**[Program Down Load]**		0 to 1			Downloads the main program from an IC card. See 'Replacement & Adjustment – System & Electronics'.
05-955: Printer internal pattern **[Printer Test Pattern Setting]**						
05-955-01	Dot, Line: LD PM setup **[LD PWM value: dot, line]**	128	0 to 255	1		See 'Service Tables – SP Mode Additional Notes' .
05-955-02	16 grayscales-1: LD_PWM setup **[LD PWM value: 1/16 Gradation]**	17	0 to 255	1		
05-955-03	16 grayscales-2: LD_PWM setup **[LD PWM value: 2/16 Gradation]**	34	0 to 255	1		
05-955-04	16 grayscales-3: LD_PWM setup **[LD PWM value: 3/16 Gradation]**	51	0 to 255	1		
05-955-05	16 grayscales-4: LD_PWM setup **[LD PWM value: 4/16 Gradation]**	68	0 to 255	1		
05-955-06	16 grayscales-5: LD_PWM setup **[LD PWM value: 5/16 Gradation]**	85	0 to 255	1		
05-955-07	16 grayscales-6: LD_PWM setup **[LD PWM value: 6/16 Gradation]**	102	0 to 255	1		
05-955-08	16 grayscales-7: LD_PWM setup **[LD PWM value: 7/16 Gradation]**	119	0 to 255	1		
05-955-09	16 grayscales-8: LD_PWM setup **[LD PWM value: 8/16 Gradation]**	136	0 to 255	1		
05-955-10	16 grayscales-9: LD_PWM setup **[LD PWM value: 9/16 Gradation]**	153	0 to 255	1		
05-955-11	16 grayscales-10: LD_PWM setup **[LD PWM value: 10/16 Gradation]**	170	0 to 255	1		
05-955-12	16 grayscales-11: LD_PWM setup **[LD PWM value: 11/16 Gradation]**	187	0 to 255	1		
05-955-13	16 grayscales-12: LD_PWM setup **[LD PWM value: 12/16 Gradation]**	204	0 to 255	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
05-955-14	16 grayscales-13: LD_PWM setup **[LD PWM value: 13/16 Gradation]**	221	0 to 255	1		See 'Service Tables – SP Mode Additional Notes' .
05-955-15	16 grayscales-14: LD_PWM setup **[LD PWM value: 14/16 Gradation]**	255	0 to 255	1		
05-955-16	16 grayscales-15: LD_PWM setup **[LD PWM value: 15/16 Gradation]**	238	0 to 255	1		
05-955-17	16 grayscales-16: LD_PWM setup **[LD PWM value: Trailing Patch]**	128	0 to 255	1		
05-955-18	Printer internal pattern type selection **[Pattern Selection]**	0	0 to 21	1		
05-963: **[Polygon Motor Power Off]**						
05-963-00	Polygon scanner pause time setup **[PlyMt Off Time]**	30 s	0 to 60 s 0: Stops immediately	1		Sets the interval from the time the last page is exited till the polygon motor stops when the copier enters the standby state after completing a job. Keep this at 30 s to prevent the motor from wearing out too early. Also, if the user complains of noise, set it to 0. The motor will stop immediately after the job.
05-979: **[SC Detection]**						
05-979-02	**[Printer SC No Check Mode]**	0	0: Check 1: Disable			Disables the self-diagnostics. SCs will not be detected.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
6. Peripherals [Pheriphs]						
06-006: ADF registration adjustment **[ADF Regist]**						
06-006-01	Main scan **[Horizontal]**	0 mm	-3.0 to 3.0 mm	0.1		Original scanning position adjustment when using the ADF. See the ARDF manual for how to use these SP modes.
06-006-02	Non-switchback (thin original), front side **[Thin Paper]**	0 step	-15 to 15 steps	1		
06-006-03	Switchback (thick original), front side **[Thick Paper]**	0 step	-15 to 15 steps	1		
06-006-04	Switchback (thick original), back side **[2 sided]**	0 step	-15 to 15 steps	1		
06-102: **[Sort/Stack Limit]**						
06-102-00	**[0: No limitation, 1: Limitation]**	1	0 to 1	1		Enables or disables the limitation on the number of sheets that can be stacked in the sorter. 0: Disabled; 1: Enabled (default). This limit can be disabled if the user requests, but the user has to make sure that jams do not occur.
06-104: Stapling Limit **[Staple Sheet Limit]**						
06-104-00	**[Staple Sheet Limit]**	1	0 to 1	1		Enables or disables the limitation on the number of sheets that can be stapled. 0: Disabled; 1: Enabled (default)This limit can be disabled if the user requests, but the user has to make sure that jams do not occur.
06-107: **[Sorter Free Run]**						
06-107-00	**[Sorter Free Run]**	0	0 to 1	1		Sorter free run

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
7. Logging						
07-008: Set Counter Display **[Set Counter Display]**						
07-008-00		1	1 to 4	1		This controls the way that the counters are displayed on the LCD. 1: Full color counter and K counter (no. of developments) 2: Full color/K counter for copier mode (no. of sheets and Full color/K counter for printer mode (no. of sheets). Other settings: Japan only
07-202: Development counter display **[Development Counter]**						
07-202-01	Total **[Developer Total Counter]**		0 to 9999999	1		Shows the tonal number of development operations.
07-202-02	K **[Developer K Counter]**		0 to 9999999	1		Shows the number of development operations for K.
07-202-03	C **[Developer C Counter]**		0 to 9999999	1		Shows the number of development operations for C.
07-202-04	M **[Developer M Counter]**		0 to 9999999	1		Shows the number of development operations for M.
07-202-05	Y **[Developer Y Counter]**		0 to 9999999	1		Shows the number of development operations for Y.
07-203: Component usage counters (components related to image production) **[Development Counter]**						
07-203-01	Drum **[Drum Counter]**		0 to 9999999	1		Shows the number of uses of components related to image production.
07-203-02	Transfer belt **[Transfer Belt Counter]**		0 to 9999999	1		
07-203-03	Scanner exhaust fan filter **[Scanner Dust Filter Counter]**		0 to 9999999	1		
07-203-04	Charge corona fan filter **[Main CH. Filter Counter]**		0 to 9999999	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-203-05	Rear cooling fan filter **[Rear Filter Counter]**		0 to 9999999	1		Shows the number of uses of components related to image production.
07-203-06	PCC wire **[Pcc Wire Counter]**		0 to 9999999	1		
07-203-07	Charge corona wire **[Main Charge Wire Counter]**		0 to 9999999	1		
07-203-08	Charge corona grid **[Main Grid Counter]**		0 to 9999999	1		
07-207: Component usage counters (components related to cleaning) **[Cleaning Counter]**						
07-207-01	**[Drum Cleaning Blade]**	Images	0-9999999 images	1		Shows the number of uses of components related to cleaning 0: To clear the counter
07-207-02	**[Drum Cleaning Brush]**	Images	0-9999999 images	1		
07-207-03	**[Drum Lubricant Bar]**	Images	0-9999999 images	1		
07-207-04	**[Transfer Belt Cleaning Brush]**	Images	0-9999999 images	1		
07-207-05	**[Transfer Belt Lubricant Bar]**	Images	0-9999999 images	1		
07-207-06	Transfer roller cleaning blade (prints) **[Paper Trns. Roller Blade [Print]]**	Pages	0-9999999 pages	1		
07-207-07	Transfer roller cleaning blade (images) **[Paper Trns. Roller Blade [Dev]]**	Images	0-9999999 images	1		
07-207-08	Transfer roller lubricant bar (prints) **[P.T. Rllr Lubricant Bar[Print]]**	Pages	0-9999999 pages	1		
07-207-09	Transfer roller lubricant bar (images) **[P.T. Rllr Lubricant Bar [Dev]]**	Images	0-9999999 images	1		
07-207-12	Transfer belt cleaning blade	Images	0-9999999 images	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-210: Component usage counters (components related to fusing) **[Roller Counter]**						
07-210-01	Hot roller (pages) **[Hot Roller [Print]]**	Pages	0-9999999 pages	1		Shows the number of uses of components related to fusing
07-210-02	Hot roller (images) **[Hot Roller [Dev]]**	Images	0-9999999 images	1		0: To clear the counter
07-210-03	Pressure roller (pages) **[Pressure Roller [Print]]**	Pages	0-9999999 pages	1		
07-210-04	Pressure roller (images) **[Pressure Roller [Dev]]**	Images	0-9999999 images	1		
07-210-05	Oil supply pad (pages) **[Oil Supply Pad [Print]]**		0 to 9999999	1		
07-210-06	Oil supply pad (images) **[Oil Supply Pad [Dev]]**		0 to 9999999	1		
07-210-07	Hot roller blade (pages) **[Hot Roller Blade [Print]]**		0 to 9999999	1		
07-210-08	Hot roller blade (images) **[Hot Roller Blade [Dev]]**		0 to 9999999	1		
07-210-09	Pressure roller blade (pages) **[Pressure Roller Blade [Print]]**		0 to 9999999	1		
07-210-10	Hot roller blade (images) **[Pressure Roller Blade [Dev]]**		0 to 9999999	1		
07-401: Total SC counter **[Total SC]**						
07-401-00		1				Shows the total number of SCs detected.
07-402: Most recent 10 SCs **[SC History]**						
07-402-01	**[latest]**	0	0 to 65535	1		Shows the 10 most recently detected SCs.
07-402-02	**[latest-1]**	0	0 to 65535	1		
07-402-03	**[latest-2]**	0	0 to 65535	1		
07-402-04	**[latest-3]**	0	0 to 65535	1		
07-402-05	**[latest-4]**	0	0 to 65535	1		
07-402-06	**[latest-5]**	0	0 to 65535	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-402-07	**[latest-6]**	0	0 to 65535	1		Shows the 10 most recently detected SCs.
07-402-08	**[latest-7]**	0	0 to 65535	1		
07-402-09	**[latest-8]**	0	0 to 65535	1		
07-402-010	**[latest-9]**	0	0 to 65535	1		
07-502 Total Number of Paper Jams **[Total Paper Jam]**						
07-502-01	**[Prt]**					Shows the total number of paper jams.
07-503 Total Number of Original Jams **[Total Original Jam]**						
07-503-01	**[Doc]**					Shows the total number of original jams.
07-504 Jam Counters **[Jam Counter]**						
07-504-01	Jams detected at any location just after closing the door or the main power is switched on**[Init]**	0	0 to 65535	1		Shows the number of paper jams at each location.
07-504-02	**[Tray1]**	0	0 to 65535	1		
07-504-03	**[Tray2]**	0	0 to 65535	1		
07-504-04	**[Tray3]**	0	0 to 65535	1		
07-504-05	**[Tray4]**	0	0 to 65535	1		
07-504-06	Duplex tray entrance **[DplxEnter]**	0	0 to 65535	1		
07-504-07	Duplex tray, interior **[FeedDplx]**	0	0 to 65535	1		
07-504-08	**[Relay Roller]**	0	0 to 65535	1		
07-504-09	Registration **[Regist]**	0	0 to 65535	1		
07-504-10	**[Transfer]**	0	0 to 65535	1		
07-504-11	**[Fusing Unit]**	0	0 to 65535	1		
07-504-12	**[ExitMain]**	0	0 to 65535	1		
07-504-13	Duplex tray exit **[ExitDplx]**	0	0 to 65535	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-504-14	**[Sorter]**	0	0 to 65535	1		Shows the number of paper jams at each location.
07-504-15	**[Staple]**	0	0 to 65535	1		
07-504-16	**[Proof Tray]**	0	0 to 65535	1		
07-505: Original Jam Counter **[Original Jam Counter]**						
07-505-01	**[Feed]**	0	0 to 65535	1		Shows the number of original jams at each location.
07-505-02	**[Exit]**	0	0 to 65535	1		
07-801: ROM version display **[ROM Version]**						
07-801-01	Main **[Main]**		0 to 1	1	Yes	Shows the ROM versions.
07-801-02	Scanner IPU **[Scanner]**		0 to 1	1	Yes	
07-801-03	IDU **[IDU]**		0 to 1	1	Yes	
07-801-04	ADF **[ADF]**		0 to 1	1	Yes	
07-801-05	Sorter **[Sorter]**		0 to 1	1	Yes	
07-801-06	Optional paper feed unit **[Bank]**		0 to 1	1	Yes	
07-801-07	FPU (film projector) **[FPU]**		0 to 1	1	Yes	
07-803: PM Counters **[PM Counter]**						
07-803-01	PM counter display **[Total No. of Dev. Cycles.]**		0 to 9999999			Shows the current value of the PM counter.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-804 **[PM Counter Clear]**						
07-804-01	PM counter all clear: 1 PM **[1PM Parts All Clear]**		1: Clear	1		Resets all counters for 1 PM components to zero.
07-804-02	PM counter all clear: 2 PM **[2PM Parts All Clear]**		1: Clear	1		Resets all counters for 2 PM components to zero.
07-804-03	PM counter clear **[PM Counter Clear]**		1: Clear	1		Resets SP 7-803-01 to zero.
07-807: **[SC/Jam Counter Clear]**						
07-807-00	**[SC/Jam Counter Clear]**		1: Clear	1		Resets the SC and jam counters to zero.
07-808: Clear All Counters **[All Counter Clear]**						
07-808-00	**[All Counter Clear]**		1: Clear	1		Resets the counters to zero, except for the PM counters SP7-804: PM counter clear SP7-807: SC and jam counters
07-809: **[Print Logging Data]**						
07-809-01	**[Loging Counter]**		1: Print	1		Prints lists of counters and other data. With 7-809-04, all three lists are output.
07-809-02	**[Jam SC History]**		1: Print	1		
07-809-03	**[Counter]**		1: Print	1		
07-809-04	**[All Page]**		1: Print	1		
07-810: Clear All Copy Counters **[All Copy Counter Clear]**						
07-810-00	**[All Copy Counter Clear]**		1: Clear	1		Resets all the copy counters to zero.
07-816: Clear All Tray Copy Counters **[Tray Copy Counter Clear]**						
07-816-00	**[Tray Copy Counter Clear]**		1: Clear	1		Resets the copy counters for each tray to zero.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-818: Clear development counters **[Dev.Counter Clear]**						
07-818-01	**[K]**		1: Clear	1		Resets the development operation counters to zero.
07-818-02	**[C]**		1: Clear	1		
07-818-03	**[M]**		1: Clear	1		
07-818-04	**[Y]**		1: Clear	1		
07-819: Clear Paper Size Counters **[Paper Size Counter Clear]**						
07-819-00	**[Paper Size Counter Clear]**		1: Clear	1		Resets the copy counters by paper size to zero.
07-825: Total Counter Reset **[Total Counter 0 Reset]**						
07-825-00	Total counter clear **[Total Counter 0 Reset]**		1: Clear	1		If the counter value is less than zero, this SP mode can be used to reset the total counter to zero.
07-902: Print Non-Default Data **[Print Non-Default Data]**						
07-902-00	Adjustment data print (non-default data) **[Print Non-Default Data]**		1: Print	1		Prints a list of settings that have been changed from their defaults.
07-903: Printout of adjustment data **[Print All Data]**						
07-903-00			1: Print			Prints all settings, including those that have not been changed from their defaults.
07-904: **[Print Printer Gamma Data]**						
07-904-01	**[Copier Mode]**		1: Print	1		Prints the gamma-related adjustment values corresponding to the copy mode SP data settings.
07-904-02	**[Printer Mode]**		1: Print	1		Prints the gamma-related adjustment values corresponding to the printer mode SP data settings.
07-905: Print PM counter values **[Print PM Data]**						
07-905-00	**[Print PM Data]**		1: Print	1		Prints the PM counter values.

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
07-910: Transfer unit counter display **[Transfer Belt Counter]**						
07-910-01	Paper separation corona wire (prints) **[Paper Separation Wire [Print]]**		0 to 9999999	1		Shows the number of uses of a transfer related component. 0: Clear
07-910-02	Paper separation corona wire (images) **[Paper Separation Wire [Dev]]**		0 to 9999999	1		
07-911: Duplex unit counter display **[Counter:Paper transfer]**						
07-911-01	Duplex separation roller (pages) **[Duplex Sep. Roller [Print]]**		0 to 9999999	1		Shows the number of uses of a duplex tray component. 0: Clear
07-911-02	Duplex separation roller (images) **[Duplex Sep. Roller [Dev]]**		0 to 9999999	1		
07-911-03	Duplex feed roller (pages) **[Duplex Feed Roller [Print]]**		0 to 9999999	1		
07-911-04	Duplex feed roller (images) **[Duplex Feed Roller [Dev]]**		0 to 9999999	1		
07-912: Exposure Lamp Counter **[Counter:Exposure Lamp]**						
07-912-01	Exposure lamp usage counter display **[Expr. Lamp [Dev]]**		0 to 9999999	1		Shows the number of times the exposure lamp has been activated. 0: Clear

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
8. Special operating modes [Special Mode]						
08-111: Special mode 1: Leading edge registration adjustment **[Sp.Mode1:LeadEdge Registration]**						
08-111-01	**[Normal Paper]**	0 mm	-5.0 to 5.0 mm	0.1		Adjusts the leading edge registration for the paper type selected when using special operating mode 1. See SP 1-001-1 to 1-001-3.
08-111-02	**[OHP]**	0 mm	-5.0 to 5.0 mm	0.1		
08-111-03	**[Thick]**	0 mm	-5.0 to 5.0 mm	0.1		
08-113: Special mode 1: Paper feed timing adjustment **[Sp.Mode1:P.Feed Tmg]**						
08-113-01	By-pass **[By-ps Feed: Normal]**	0 mm	-5.0 to 5.0 mm	0.1		See SP 1-003.
08-113-02	Copier paper feed **[Tray Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-113-03	By-pass: Half speed **[By-ps Feed: Half Speed]**	2mm	-5.0 to 7.0 mm	0.1		
08-113-05	Duplex, side 2 **[Dplx Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-115: Special mode 1, hot & pressure roller temperature setup **[Sp.Mode1:Rllr.Tmp]**						
08-115-02	Hot roller, 1 sided: Standby mode **[Hot Rllr/ Standby]**	165°C	100 to 200 °C	1		See SP 1-105.
08-115-03	Hot roller, 1 sided: Copy mode FC **[Hot Rllr/ Nrml: FC]**	165°C	100 to 200 °C	1		
08-115-04	Hot roller, 1 sided: Copy mode 1C **[Hot Rllr/ Nrml: SC]**	160 °C	100 to 200 °C	1		
08-115-07	Pressure roller, 1-sided: Standby mode **[Pressure Rllr/ Standby]**	150 °C	100 to 200 °C	1		
08-115-08	Pressure roller, 1 sided: Copy mode FC **[Pressure Rllr/ Nrml: FC]**	150 °C	100 to 200 °C	1		
08-115-09	Pressure roller, 1 sided: Copy mode 1C **[Pressure Rllr/Nrml: SC]**	150 °C	100 to 200 °C	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-130: Special mode 1: Paper transfer bias, image area **[Sp.Mode1: Image]**						
08-130-02	**[1C]**	10 µA	1 to 50 µA	1		See SP 2-310.
08-130-05	**[4C]**	18µA	1 to 50 µA	1		
08-130-18	**[1C Back]**	10 µA	1 to 50 µA	1		
08-130-21	**[4C Back]**	15µA	1 to 50 µA	1		
08-134: Special mode 1: Paper transfer bias, leading edge area correction **[SP.Mode1:Lead Edge Current]**						
08-134-01	**[1C]**	0 µA	-20 to 40 µA	1		See SP 2-314.
08-134-04	**[4C]**	0 µA	-20 to 40 µA	1		
08-134-17	**[1C Back]**	0 µA	-20 to 40 µA	1		
08-134-20	**[4C Back]**	2µA	-20 to 40 µA	1		
08-135: Special mode 1: Paper transfer bias, trailing edge correction **[SP.Mode1:Trail Edge Current]**						
08-135-01	**[1C]**	0 µA	-20 to 40 µA	1		See SP 2-315.
08-135-04	**[4C]**	0 µA	-20 to 40 µA	1		
08-135-17	**[1C Back]**	0 µA	-20 to 40 µA	1		
08-135-20	**[4C Back]**	0 µA	-20 to 40 µA	1		
08-136: Special mode 1: Paper transfer bias, environment correction coefficient **[Sp.Mode1:Tmp/Hum Corection]**						
08-136-01	Low temperature, low humidity ,1C **[Low Tmp/Hum: 1C]**	100%	10 to 400%	1		See SP 2-316.
08-136-02	Low temperature, low humidity, 4C **[Low Tmp/Hum: 4C]**	100%	10 to 400%	1		
08-136-05	High temperature, high humidity, 1C **[High Tmp/Hum: 1C]**	100%	10 to 400%	1		
08-136-06	High temperature, high humidity, 4C **[High Tmp/Hum: 4C]**	100%	10 to 400%	1		
08-136-33	Low temperature, low humidity, 1C Back side **[Low Tmp/Hum: 1C Back]**	100%	10 to 400%	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-136-34	Low temperature, low humidity, 4C Back side **[Low Tmp/Hum: 4C Back]**	100%	10 to 400%	1		See SP 2-316.
08-136-37	High temperature, high humidity, 1C Back side **[High Tmp/Hum: 1C Back]**	100%	10 to 400%	1		
08-136-38	High temperature, high humidity, 4C Back side **[High Tmp/Hum: 4C Back]**	100%	10 to 400%	1		
08-211: Special mode 2: Leading edge registration adjustment **[Sp.Mode2:LeadEdge Registration]**						
08-211-01	**[Normal Paper]**	0 mm	-5.0 to 5.0 mm	0.1		Adjusts the leading edge registration for the paper type selected when using special operating mode 2. See SP 1-001-1 to 1-001-3.
08-211-02	**[OHP]**	0 mm	-5.0 to 5.0 mm	0.1		
08-211-03	**[Thick]**	0 mm	-5.0 to 5.0 mm	0.1		
08-213: Special mode 2: Paper feed timing adjustment **[Sp.Mode2:P.Feed Tmg]**						
08-213-01	By-pass **[By-ps Feed: Normal]**	0 mm	-5.0 to 5.0 mm	0.1		See SP 1-003.
08-213-02	Copier paper feed **[Tray Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-213-03	By-pass: Half speed **[By-ps Feed: Half Speed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-213-05	Duplex, side 2 **[Dplx Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-215: Special mode 2: hot/pressure roller temperature setup **[Sp.Mode2:Rllr.Tmp]**						
08-215-02	Hot roller, 1 sided: Standby mode **[Hot Rllr/ Standby]**	165°C	100 to 200 °C	1		See SP 1-105.
08-215-03	Hot roller, 1 sided: Copy mode FC **[Hot Rllr/ Nrml: FC]**	165°C	100 to 200 °C	1		
08-215-04	Hot roller, 1 sided: Copy mode 1C **[Hot Rllr/ Nrml: SC]**	160 °C	100 to 200 °C	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-215-07	Pressure roller, 1 sided: Standby mode **[Pressure Rllr/ Standby]**	150 °C	100 to 200 °C	1		See SP 1-105.
08-215-08	Pressure roller, 1 sided: Copy mode FC **[Pressure Rllr/ Nrml: FC]**	150 °C	100 to 200 °C	1		
08-215-09	Pressure roller, 1 sided: Copy mode 1C **[Pressure Rllr/ Nrml: SC]**	150 °C	100 to 200 °C	1		
08-230: Special mode 2: Paper transfer bias, image area **[Sp.Mode2: Image]**						
08-230-02	**[1C]**	15µA	1 to 50 µA	1		See SP 2-310.
08-230-05	**[4C]**	15µA	1 to 50 µA	1		
08-230-18	**[1C Back]**	10 µA	1 to 50 µA	1		
08-230-21	**[4C Back]**	10 µA	1 to 50 µA	1		
08-234: Special mode 2: Paper transfer bias, leading edge area correction **[SP.Mode2:Lead Edge Current]**						
08-234-01	**[1C]**	0 µA	-20 to 40 µA	1		See SP 2-314.
08-234-04	**[4C]**	0 µA	-20 to 40 µA	1		
08-234-17	**[1C Back]**	2µA	-20 to 40 µA	1		
08-234-20	**[4C Back]**	4µA	-20 to 40 µA	1		
08-235: Special mode 2: Paper transfer bias, trailing edge correction **[SP.Mode2:Trail Edge Current]**						
08-235-01	**[1C]**	0 µA	-20 to 40 µA	1		See SP 2-315.
08-235-04	**[4C]**	0 µA	-20 to 40 µA	1		
08-235-17	**[1C Back]**	-3µA	-20 to 40 µA	1		
08-235-20	**[4C Back]**	-3µA	-20 to 40 µA	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-236: Special mode 2: Paper transfer bias, environment correction coefficient **[Sp.Mode2:Tmp/Hum Corection]**						
08-236-01	Low temperature, low humidity: 1C **[Low Tmp/Hum: 1C]**	100%	10 to 400%	1		See SP 2-316.
08-236-02	Low temperature, low humidity: 4C **[Low Tmp/Hum: 4C]**	100%	10 to 400%	1		
08-236-05	High temperature, high humidity: 1C **[High Tmp/Hum: 1C]**	100%	10 to 400%	1		
08-236-06	High temperature, high humidity: 4C **[High Tmp/Hum: 4C]**	100%	10 to 400%	1		
08-236-33	Low temperature, low humidity: 1C Back side **[Low Tmp/Hum: 1C Back]**	100%	10 to 400%	1		
08-236-34	Low temperature, low humidity: 4C Back side **[Low Tmp/Hum: 4C Back]**	100%	10 to 400%	1		
08-236-37	High temperature, high humidity: 1C Back side **[High Tmp/Hum: 1C Back]**	100%	10 to 400%	1		
08-236-38	High temperature, high humidity: 4C Back side **[High Tmp/Hum: 4C Back]**	100%	10 to 400%	1		
08-311: Special mode 3: Leading edge registration adjustment **[Sp.Mode3:LeadEdge Registration]**						
08-311-01	Normal paper **[Normal Paper]**	0 mm	-5.0 to 5.0 mm	0.1		Adjusts the leading edge registration for the paper type selected when using special operating mode 3. See SP 1-001-1 to 1-001-3.
08-311-02	OHP **[Tray Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-311-03	Thick paper **[By-ps Feed: Half Speed]**	0 mm	-5.0 to 5.0 mm	0.1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-313: Special mode 3: Paper feed timing adjustment **[Sp.Mode3:P.Feed Tmg]**						
08-313-01	By-pass **[By-ps Feed: Normal]**	0 mm	-5.0 to 5.0 mm	0.1		See SP 1-003.
08-313-02	Copier paper feed **[Tray Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-313-03	By-pass: Half speed **[By-ps Feed: Half Speed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-313-05	Duplex, side 2 **[Dplx Feed]**	0 mm	-5.0 to 5.0 mm	0.1		
08-315: Special mode 3: hot & pressure roller temperature setup **[Sp.Mode3:Rllr.Tmp]**						
08-315-02	Hot roller: 1 sided: Standby mode **[Hot Rllr/ Standby]**	165°C	100 to 200 °C	1		See SP 1-105.
08-315-03	Hot roller: 1 sided: Copy mode FC **[Hot Rllr/ Nrml: FC]**	165°C	100 to 200 °C	1		
08-315-04	Hot roller: 1 sided: Copy mode 1C **[Hot Rllr/ Nrml: SC]**	160 °C	100 to 200 °C	1		
08-315-07	Pressure roller: 1 sided: Standby mode **[Pressure Rllr/ Standby]**	150 °C	100 to 200 °C	1		
08-315-08	Pressure roller: 1 sided: Copy mode FC **[Pressure Rllr/ Nrml: FC]**	150 °C	100 to 200 °C	1		
08-315-09	Pressure roller: 1 sided: Copy mode 1C **[Pressure Rllr/ Nrml: SC]**	150 °C	100 to 200 °C	1		
08-330: Special mode 3: Paper transfer bias, image area **[Sp.Mode3: Image]**						
08-330-02	**[1C]**	µA	1 to 50 µA	1		See SP 2-310.
08-330-05	**[4C]**	µA	1 to 50 µA	1		
08-330-18	**[1C Back]**	µA	1 to 50 µA	1		
08-330-21	**[4C Back]**	µA	1 to 50 µA	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-334: Special mode 3: Paper transfer bias, leading edge area correction **[SP.Mode3:Lead Edge Current]**						
08-334-01	**[1C]**	µA	-20 to 40 µA	1		See SP 2-314.
08-334-04	**[4C]**	µA	-20 to 40 µA	1		
08-334-17	**[1C Back]**	µA	-20 to 40 µA	1		
08-334-20	**[4C Back]**	µA	-20 to 40 µA	1		
08-335: Special mode 3: Paper transfer bias, trailing edge correction **[SP.Mode3:Trail Edge Current]**						
08-335-01	**[1C]**	µA	-20 to 40 µA	1		See SP 2-315.
08-335-04	**[4C]**	µA	-20 to 40 µA	1		
08-335-17	**[1C Back]**	µA	-20 to 40 µA	1		
08-335-20	**[4C Back]**	µA	-20 to 40 µA	1		
08-336: Special mode 3: Paper transfer bias, environment correction coefficient **[Sp.Mode3:Tmp/Hum Corection]**						
08-336-01	Low temperature, low humidity: 1C **[Low Tmp/Hum: 1C]**	100%	10 to 400%	1		See SP 2-316.
08-336-02	Low temperature, low humidity: 4C **[Low Tmp/Hum: 4C]**	100%	10 to 400%	1		
08-336-05	High temperature, high humidity: 1C **[High Tmp/Hum: 1C]**	100%	10 to 400%	1		
08-336-06	High temperature, high humidity: 4C **[High Tmp/Hum: 4C]**	100%	10 to 400%	1		
08-336-33	Low temperature, low humidity: 1C Back side **[Low Tmp/Hum: 1C Back]**	100%	10 to 400%	1		
08-336-34	Low temperature, low humidity: 4C Back side **[Low Tmp/Hum: 4C Back]**	100%	10 to 400%	1		
08-336-37	High temperature, high humidity: 1C Back side **[High Tmp/Hum: 1C Back]**	100%	10 to 400%	1		

SP No.	Item [Display]	Default Value	Value Range	Step	SP7-902/3	Description
08-336-38	High temperature, high humidity: 4C Back side **[High Tmp/Hum: 4C Back]**	100%	10 to 400%	1		See SP 2-316.

APPENDIX-3

SC CODE TABLE

SC CODES

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC101	Exposure lamp failure	- Timing & Condition - • The lamp output check signal (LAMPDET) is still HIGH 250 ms after the lamp turns on (the ON check is canceled if the lamp goes off within 250 ms). • The lamp output check signal is still LOW 30ms after the lamp turns off (the OFF check is canceled if the lamp turns on within 30 ms).	• Blown lamp • Blown thermostat • Blown fuse (FU103) • Defective lamp regulator • Poor connection of cables • Defective cables • Defective scanner IPU board • Defective PSU		1. Visually check the lamp element or check the continuity between both ends of the lamp terminals with a multi-meter. 2. Check continuity at the ends of the thermostat terminals with a multi-meter. 3. Check if the connectors (CN1, CN2, and CN3) on the lamp regulator are properly connected. 4. Check the continuity of the 3 cables. 5. Replace the lamp regulator if 100Vac is present at the CN3-1 and 5 on the lamp regulator. 6. Replace the scanner IPU board - Signals to Check - • LAMPDET: CN502-2 on lamp regulator / CN403-12 on scanner IPU board • LAMPTRIG: CN403-11 on scanner IPU board / CN502-3 on lamp regulator	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC120	Scanner HP sensor does not turn on	- Timing & Condition - The scanner H.P. sensor does not turn on when the scanner moves back to the home position or at the home position check. The sensor output at CN406-7 stays HIGH (5V).	• Scanner motor out of synchronization (drive error) • Poor connection of connectors • Defective scanner HP sensor • Defective scanner IPU board • Defective main control board	SC121	1. In SP 5-804-104, stop supplying the current to the scanner motor. Check the output signal from the scanner H.P. sensor in SP 5-803-100 by moving the scanner manually. (0: Not actuated; 1: Actuated - at H.P.) 2. If the result of step 1 is OK; 1 Check the tension of the timing belt. 2 Check if the pulley is firmly secured. 3 Check if the scanner wire is properly wired 4 Check the connection of CN710, and CN731 on the scanner motor drive board. 5 Check continuity of cables. 6 Replace the scanner motor drive board. 7 Replace the scanner motor. 3. If the result of step 1 is not OK; 1 Check if the cable is properly connected. 2 Check the continuity of cable. 3 Replace the sensor. 4 Replace the scanner IPU board. 5 Replace the main control board. - Signals to Check - • Scanner HP: CN406-7 on scanner IPU board	D
SC121	Scanner HP sensor does not turn off	- Timing & Condition - The sensor does not turn off when the scanner moves to the home position after scanning an original. The sensor output at CN406-7stays LOW (0V).	Same as SC120	SC120	Same as SC120.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC130	Scanner start error	- Timing - • Scanning start • While the scanner motor is running - Condition - The scanning start signal is generated while the motor is moving. Total number of steps calculated based on the signal from the stepper motor is out of range. The H.P. sensor stays off when the scanner starts moving. A 'scan start' command was issued while the motor was active.	Same as SC120 or Sequence error		Same as SC120 or Replace the sub and/or main scanner IPU board(s).	D
SC150	Scanner ROM mismatch	- Timing - After software installation or just after the main switch is turned on - Condition - The scanner IPU board detects that the software installed is not the correct one.	• An invalid IC card used (such as a card for a different model) • Replace the scanner IPU board.		Try again with the correct IC card. Replace the scanner IPU board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC170	Video processing error 1	- Timing - Just after the main switch is turned on (after auto gain control on the scanner IPU board) - Condition - The corrected CCD odd/even pixel black level difference is not in the proper range.	• Poor connection of CCD flat cable • Defective scanner IPU board • Defective CCD		1. Check if the flat cable is firmly connected at CN421 and CN404 on the SBU and scanner IPU board. 2. Check the continuity of the flat cable. 3. Replace the scanner IPU board. 4. Replace the SBU unit.	D
SC171	Video processing error 2	- Timing - Same as SC170 - Condition - The corrected black level is not in the proper range.	Same as SC170		Same as SC170.	D
SC172	Video processing error 3	- Timing - Same as SC170 - Condition - The corrected white level is not in the proper range.	• Poor connection of CCD cable • Dirty optics • Defective lamp regulator • Defective scanner IPU board • Defective CCD		1. Check SP 4-426-001 to 006 (RGB Gain). If their values are near “255”, clean the optics section (exposure glass, white plate, mirrors, and lens). 2. Visually check if the exposure lamp turns on during warming-up after the main switch is turned on. If not, replace the lamp regulator. 3. Check if the CCD flat cable is firmly connected at CN421 and CN404 on the SBU and scanner IPU board. 4. Check the continuity of the flat cable. 5. Replace the scanner IPU board. 6. Replace the SBU unit.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC191	Bar code scan error	- Timing - Just after the main switch is turned on - Condition - The scanner IPU board detects that the bar code pattern scanned in is not appropriate.	• Non-standard bar code label • Improper location of bar code • Dirty bar code • Defective scanner IPU board • Defective main control board		1. Check if the bar code is damaged or scratched. 2. Clean the optics section components, such as mirrors and lenses, and the bar code label. 3. Check if the mirrors are properly positioned on the 1st and 2nd scanners. If the spring plate which secures the mirrors is out of position, it causes the light axis to be changed. 4. Replace the scanner IPU board. 5. Replace the main control board.	D
SC192	Bar code number mismatch	- Timing - Just after the main switch is turned on - Condition - The main control board detects that the bar code data scanned in does not match the machine identification number stored in the RAM.	• Defective RAM board • Defective scanner IPU board • Defective main control board		1. Check if the serial number stored in the RAM is correct. NOTE:. Contact your product specialist for the detailed procedure. 2. Check the copier's serial number and the number defined in SP mode. 3. Garbled ROM data: Replace the NV-RAM. 4. Replace the scanner IPU board. 5. Replace the main control board.	D
SC193	IDU error	- Timing - Just after the main switch is turned on or during a hardware reset - Condition - The IDU starts self-diagnosis at power-on and a hardware error was detected during this.	• Defective IDU • Defective scanner IPU board		1. Test the scanner IPU board (SP 4-904-001 and 002). If not OK, replace the scanner IPU board. 2. Replace the IDU board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC195	Serial number error	- Timing - Just after the main switch is turned on - Condition - The serial number entered or stored in RAM is not correct.	• Incorrect serial number • RAM board is replaced. • Defective RAM		1. Check and re-enter the serial number properly. NOTE: Contact your product specialist for the detailed procedure.	D
SC301	Charge current leak	- Timing - When the charge corona unit is on during printing or process control - Condition - The current leak was detected for 2 seconds.	• Charge corona unit not installed properly • Poor connection of cables • Defective high voltage supply board (C,G) • Defective I/O control board • Defective main control board.		1. Reinstall the charge corona unit properly or replace the charge corona unit. 2. Reconnect the connectors on the high voltage supply board (C,G), I/O control board, and main control board, or check the cables. 3. Check and clean the charge corona unit receptacle. 4. Replace the high voltage supply board (C,G). 5. Replace the I/O control board. 6. Replace the main control board. - Signals to Check - • Leak detection: CN201-1 or TP224 on I/O control board or TP162 on main control board	D
SC302	Charge corona grid voltage error	- Timing - When the charge corona unit grid is on during printing or process control - Condition - The feedback voltage is 4.8V or higher, or the PMW value is 50% or higher for 500 ms continuously.	Same as SC301		Same as for SC301 - Signals to Check - • Feedback signal: CN201-3 or TP226 on I/O control board or CN302-A4 or TP160 on main control board • PWM: CN201-4 or TP237 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC320	Polygon motor error	- Condition - • The PMLOCK signal is not received by the LD main control board within a predetermined period of time.	• Poor connection of connector • Defective polygon motor • Defective LD main control board • Defective scanner IPU board		1. Check that the connector (CN602-4) on the LD control board is properly connected. 2. Check the continuity of cable. 3. Replace the polygon motor. 4. Replace the LD main control board. 5. Replace the scanner IPU board.	D
SC322	Laser synchronizing signal error	- Timing & Condition - While the polygon motor is running and the laser diode is on, the LD main control board does not receive the laser synchronizing signal.	• Poor connection of connectors • Defective laser synchronizing detector board • Improper laser beam axis • Defective LD control board • Defective main control board • Defective optic housing unit		1. Check if the connectors (CN 604) are properly connected on the laser synchronizing detector board and LD main control board 2. Remove and clean the synchronizing detector board. 3. Check if anything such as the seal of the barrel toroidal lens in the optic housing unit interferes with the laser beam axis. 4. Replace the synchronizing detector board. 5. Check if the cable connectors (CN1 & CN605) on the LD drive board and LD main control board are properly connected or check the continuity of the cable. 6. Check if the cable connectors (CN601 & CN306) on the LD main control board and main control board are properly connected or check the continuity of the cable. 7. Replace the LD main control board. 8. Replace the main control board 9. Check the optical housing unit or replace it.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC323	LD error	- Timing - During LD writing - Condition - The LD main control board detects over-current or no feedback signal from the LD drive board.	• Poor connection of connector • Defective LD drive board • Defective LD main control board • Defective main control board		1. Check if the connectors (CN1 & CN605) on the LD drive board and LD main control board are properly connected. 2. Check the continuity of the cable. 3. Check that the cable connectors (CN601 & CN306) on the LD control board and main control board are properly connected. 4. Replace the LD drive board. 5. Replace the LD main control board 6. Replace the main control board.	D
SC325	Magnification correction error	The length of a line measured during main scan auto magnification correction does not fall within -0.1% to 0.1% of the center value. Detection timing: When three main scan magnification corrections failed successively.	Dirty or incorrectly installed synch. detector board, or defective polygon motor		This SC is only logged, and not displayed, so no particular action is required (no adverse influence is exerted on copier operation). Take the following actions if the customer complains about excessive magnification errors. Dirty synchronizing detector board: Clean it Incorrect synchronizing detector board installation: Reinstall Defective polygon motor: Replace.	C

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC326	FGATE1 error	- Timing & Condition - The main control board does not receive the FGATE signal from the LD control board during 3 revolutions of the transfer belt.	• Belt mark detection error • Electrical noise • Poor connection of connectors		1. Clean the belt mark located on the back side of the transfer belt or replace the belt if the belt mark is dirty or peeled off. 2. Clean the transfer belt home position sensor if it is dirty. 3. Clean the bias terminals of the development units if they are dirty. 4. Check if the cable connectors (CN606 & NC408) on the LD main control board and scanner IPU board are properly connected. 5. Check if the cable connectors (CN601 & CN306) on the LD main control board and main control board are properly connected. 6. Replace the LD main control board. 7. Replace the main control board. - Signals to Check - • FGATE: CN601-A2 or TP608 on LD main control board / CN306-A9 on main control board • Belt mark: CN218-B11, TP210, or CN233-A6 on I/O control board / CN303-B1, TP108, or CN306-B2 on main control board / CN601-B9 or TP606 on LD main control board If the machine is equipped with the controller, 1. Check if the connectors (CN609) on the LD control board and controller I/F board are properly set. 2. Check if the controller I/F board is properly connected. 3. Replace the interface board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC327	FGATE2 error	- Timing & Condition - When two pages are to be written on the transfer belt at the same time, the main control board does not receive the 2nd FGATE signal from the LD main control board during 3 revolutions of the transfer belt.	Same as SC326		Same as SC326.	D
SC360	Development bias error	- Timing - When the development DC bias is on during printing or process control - Condition - The feedback voltage is 4.8V or higher, or the PWM value becomes 80% or higher for 500 ms continuously.	• Poor connection of connectors • Dirty terminals • Defective high voltage supply (B) • Defective I/O control board • Defective main control board		1. Clean the development roller shaft (terminal). 2. Clean the bias terminal if it is dirty. 3. Poor connection: Correct the leaf spring shape. 4. Replace the bias terminal if it does not move smoothly. 5. Check the connectors of high voltage supply cable and trigger lines are properly connected on the high voltage supply board (B), I/O control board, and main control board. 6. Replace the high voltage supply board (B) 7. Replace the I/O control board. 8. Replace the main control board. - Signals to Check - • Feedback signal: CN203-A12, TP228, or CN214-A5 on I/O control board / CN302-A5 or TP167 on main control board • PWM: CN203-A13 or TP234 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC361	Revolver HP sensor error	- Timing & Condition - The home position is not detected during 3 revolutions of the revolver unit after the revolver motor turns on.	• Poor connection of connector • Dirty sensor • Defective sensor • Defective revolver motor • Defective revolver drive board • Defective I/O control board • Defective main control board		1. Check if the sensor connector is properly connected. 2. Replace the revolver H.P. sensor if the voltage at CN203-A4 on the I/O control board does not change when covering the sensor with a piece of paper. NOTE: Make sure that the revolver unit is locked for this step. 3. If the revolver unit does not rotate; 1 Replace the revolver motor. 2 Replace the revolver motor drive board. 3 Replace the I/O control board. 4 Replace the main control board. - Signals to Check - • Revolver H.P.: CN203-A4 or TP211 on I/O control board	D
SC385	ID sensor VSG adjustment error	- Timing - During process control self check, the main control board detects that the Vsg signal fed back from the ID sensor is out of range.	• Dirty ID sensor • Poor connection of connector • Defective ID sensor • Poor cleaning		1. Clean the ID sensor. 2. Check if the sensor connector is properly connected. 3. Replace the ID sensor. 4. Check the drum cleaning unit. - Signals to Check - • ID sensor LED: CN203-B9 or TP252 on I/O control board • ID sensor 1 (K): CN203-B10 or TP227 on I/O control board / TP174 on main control board. • ID sensor 2 (CMY): CN203-B11 or TP229 on I/O control board / TP173 on main control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC386	Amount of toner on sensor pattern too low during ID pattern measurement	The amount of toner obtained during YCM ID pattern measurement was less than (target value for the amount of toner) minus (threshold value for detecting insufficient toner density) 5 consecutive times, even though there was no toner end condition - If ID sensor error (SC385) is detected before this SC, no detection is attempted unless Vsg is adjusted and the ID sensor error condition is reset. - This SC does not apply to black toner since the toner end sensor is not used for Bk.	Defective toner end sensor, dirt in toner cartridge end sensor window		This SC is only logged in the memory (not displayed), so no particular action is required (no adverse influence is exerted on copier operation). Defective toner end sensor: SP5-803-010 (Input check: toner end sensor), replace if necessary. Dirty toner end sensor window: Clean. Toner supply seal peeled off: Remove the cartridge and check the seal in the hopper.	C
SC387	Drum potential error	- Timing - During initial process control check or interval (number of copies) process control self check - Condition - While the revolver unit returns to the home position, the following condition is detected. $V_D < V_G - 200V$ $V_D > V_G + 200V$	• Uneven charge • Worn drum • Defective potential sensor		1. Clean the charge corona unit or replace the charge corona wire and grid plate. 2. Reinstall the drum. 3. Replace the drum if necessary. 4. Replace the potential sensor.	C

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC400	Image transfer belt bias error	- Timing - When the image transfer belt bias is on during printing or a process control self check - Condition - The feedback voltage is 4.8V or higher, or the PWM value is 50% or higher (indicating a leak) for 500 ms continuously. 	• Poor connection of connectors • Defective high voltage supply board (T1,PCC) • Defective I/O control board • Defective main control board		1. Check if the connectors of high voltage cables and trigger lines are properly connected on the high voltage supply board, I/O control board, and main control board. 2. Clean the bias terminals. 3. Replace the high voltage supply board (T1,PCC). 4. Replace the I/O control board. 5. Replace the main control board. - Signals to Check - • Feedback signal: CN277-B3, TP221, or CN214-A4 on I/O control board / CN302-A6 or TP158 on main control board. • PWM: CN227-B4 or TP209 on I/O control board.	D
SC422	PCC leak	- Timing & Condition - When the current leak is detected for 2 seconds, leak detection starts 1 second after the PCC turns on. The leak signal is monitored twice at 1 second intervals. When the leak condition is detected twice continuously, this SC is displayed.	• PCC unit not properly set • Corona wire broken • Defective high voltage supply board (T1,PCC) • Defective I/O control board • Defective main control board		1. Check if the PCC unit is properly instaled. 2. Replace the corona wire if it is broken. 3. Check if the connectors on the terminal and high voltage supply board (T1,PCC) are properly connected and if the cables are damaged. 4. Clean the receptacle. 5. Replace the high voltage supply board (T1,PCC). 6. Replace the I/O control board. 7. Replace the main control board. - Signals to Check - • Leak detection: CN227-B1 or TP294 on I/O control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC440	Drum motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is on.	• Poor connection of connector • Defective drum motor • Defective I/O control board • Defective main control board		1. Check if the drum is locked by the cleaning blade. If it is, replace the cleaning blade. 2. Check if the connector (CN223) on the I/O control board is properly connected. 3. Check if the drum motor works properly using SP 5-804-001 to 004. If not, replace the drum motor. 4. Replace the I/O control board. 5. Replace the main control board. - Signals to Check - • Motor OK: CN223-B5 or TP295 on the I/O control board	D
SC450	Paper transfer bias current error	- Timing - When the paper transfer bias is on during printing - Condition - The feedback voltage is 4.8V or higher (indicating a leak), or PWM value is 50% or higher for 500 ms continuously.	• Defective high voltage supply (T2,D) • Defective I/O control board • Defective main control board		1. Check if the connectors of high voltage cables and trigger lines are properly connected on the high voltage supply board (T2,D), I/O control board, and main control board. 2. Replace the high voltage supply board (T2,D). 3. Replace the I/O control board. 4. Replace the main control board. - Signals to Check - • Feedback signal: CN227-A3, TP220, or CN214-A3 on I/O control board / CN302-A7 or TP105 on the main control board • PWM: CN227-A4 or TP208 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC452	Transfer belt mark detection error	- Timing & Condition- The main control board does not receive the belt mark detection signal from the transfer belt home position sensor for a certain period.	• Dirty or damaged belt mark • Belt mark out of position • Defective sensor • Defective I/O control board • Defective main control board		1. Check if the transfer belt release lever is properly set. 2. Clean the belt mark if it is dirty. 3. Replace the transfer belt if a belt mark has peeled off or is damaged. 4. Clean the transfer belt home position sensor if it is dirty. 5. Replace the transfer belt home position sensor. 6. Replace the I/O control board. 7. Replace the main control board. - Signals to Check - • Sensor: CN223-A6, TP210, or CN218-B11 on I/O control board / CN303-B1 or TP137 on the main control board.	D
SC456	Paper transfer unit position error	- Timing & Condition • The paper transfer home position sensor does not detect the paper transfer unit moving into the contact position or the release position at the correct time.	• Defective paper transfer positioning clutch • Defective I/O control board		1. Replace the paper transfer H.P. sensor. (Input Check: SP 5-803-11) 2. Replace the paper transfer positioning clutch. (Output Check: SP 5-804-23) 3. Replace the I/O control board. - Signals to Check - • H.P.: CN229-5 or TP286 on I/O control board	D
SC457	Image transfer belt cleaning unit position error	- Timing & Condition • The belt cleaning home position sensor does not detect the transfer belt cleaning unit moving into the contact position or the release position at the correct time.	• Dirty sensor • Defective sensor • Defective belt cleaning clutch • Defective I/O control board • Defective main control board		1. Pull out and re-insert the image transfer belt unit. 2. Clean the belt cleaning H.P. sensor if it is dirty. 3. Replace the sensor. (Input Check: 5-803-12) 4. Replace the belt cleaning clutch. (Output Check: SP 5-804-36) 5. Replace the I/O control board. 6. Replace the main control board. - Signals to Check - • H.P.: CN202-2 or TP254 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC495	Temperature sensor error	- Timing & Condition - The temperature sensor output is out of range (2.75V or greater or less than 0.25V).	• Poor connection of connector • Defective humidity sensor • Defective I/O control board • Defective main control board		1. Check that the connectors (CN236, 214 & CN302) are properly connected on the I/O control board and main control board. 2. Replace the humidity sensor. 3. Replace the I/O control board. 4. Replace the main control board. - Signals to Check - • Temperature: CN236-6, TP247, or CN214-A9 on I/O control board / CN302-A1 or TP223 on main control board	C
SC496	Humidity sensor error	- Timing & Condition - The humidity sensor output is out of range (2.75V or greater or less than 0.25V)	• Poor connection of connector • Defective humidity sensor • Defective I/O control board • Defective main control board		1. Check the connector is properly connected on the I/O board (CN236). 2. Replace the humidity sensor. 3. Replace the I/O control board. 4. Replace the main control board. - Signals to Check - • Humidity: CN236-3, TP222, or CN214-A8 on I/O control board / CN302-A2 or TP168 on main control board	C
SC500	Fusing motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is on.	• Poor connection of connector • Defective fusing motor • Defective I/O control board • Defective main control board		1. Check if the connector (CN204) is properly connected on the I/O control board. 2. Replace the fusing motor. (Output check: SP 5-804-05,-06,-07,-08) 3. Replace the I/O control board. 4. Replace the main control board. 5. Check if anything causes overload for the fusing unit drive. - Signals to Check - • Motor OK: CN204-7 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC501	1st paper tray error	- Timing & Condition - • The upper limit sensor does not turn on1.5 s after the tray bottom plate starts to go up.	• Defective upper limit sensor • Defective tray bottom plate • Defective I/O control board • Defective main control board	SC502 SC503 SC504	1. Check if the spring of pick-up solenoid comes off. 2. Check if the sensor cable is properly connected. 3. Clean or replace the sensor and replace it if necessary (Input Check: SP 5-803-14 to 17). 4. Replace the tray bottom lever if it is broken. 5. Pull out the paper tray and check if the tray lift motor works properly (Output Check: SP 5-804-75 to 82). 6. Replace the I/O control board. 7. Replace the main control board. - Signals to Check - • Limit sensor H.P.: CN226-2 or TP206 on I/O control board	B
SC502	2nd paper tray error	Same as SC501			Same as SC501	B
SC503	3rd paper tray error	Same as SC501		SC501 SC502 SC504	Same as SC501	B
SC504	4th paper tray error	Same as SC501		SC501 SC502 SC503	Same as SC501	B
SC510	Paper feed motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is on.	• Poor connection of connector • Defective paper feed motor • Defective I/O control board • Defective main control board • Mechanical overload		1. Check if the connector is properly connected on the I/O control board (CN224). 2. Replace the paper feed motor. (Output check: SP 5-804-08 to 09) 3. Replace the I/O control board. 4. Replace the main control board. 5. Check the feed unit drive section and if anything causes overload. - Signals to Check - • Motor OK: CN224-B4 or TP297 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC522	Duplex - Side fence jogger H.P. error	- Timing & Condition - • The home position is still detected a few seconds after the side fence leaves from the home position. • The home position is not detected 12 seconds after the side fence moves back to the home position.	• Duplex unit not set properly • Excessive load • Poor connection of connector • Defective side fence motor • Defective I/O control board	SC524	1. Pull out and re-insert the duplex unit. 2. Check the connector (CN485) is properly connected on the duplex control board. 3. Check if anything causes overload to the motor. 4. Replace the side fence motor (Output Check: SP 5-804 93 and 94). 5. Replace the I/O control board.	B
SC524	Duplex - End fence jogger H.P. error	- Timing & Condition - • The home position is still detected a few seconds after the end fence leaves from the home position. • The home position is not detected 13 seconds after the end fence moves back to the home position.	• Duplex unit not set properly • Excessive load • Poor connection of connector • Defective end fence motor • Defective I/O control board	SC522	1. Pull out and re-insert the duplex unit. 2. Check the connector (CN486) is properly connected on the duplex control board. 3. Check if anything causes overload to the motor. 4. Replace the end fence motor (Output Check: SP 5-804 95 and 96). 5. Replace the I/O control board.	B
SC541	Hot roller thermistor open	- Timing - Every 1 second when the fusing unit is installed - Condition - The hot roller thermistor output is almost close to 5V, which corresponds to 0 °C, for 6 seconds continuously.	• Fusing unit not set properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board		1. Check if the fusing unit is properly set. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the Temperature/ Resistance Conversion Reference Table at the end of this table.) 5. Replace the I/O control board. 6. Replace the main control board. - Signals to Check - • Thermistor: CN206-B9, TP231, or CN214-B1 on I/O control board / CN302-B9 or TP154 on main control board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC542	Hot roller warm-up error	- Timing & Condition - The hot roller thermistor does not output an analog value corresponding to the ready temperature within 12 minutes after the main switch is turned on.	• Poor connection of connectors • Hot roller fusing lamp blown • Hot roller thermofuse opened • Power fluctuation • Defective main control board • Defective I/O control board • Defective AC drive board		1. Check if the following connectors are properly connected: • Hot roller fusing lamp connectors • CN303 on the main control board • CN206 and CN214 on the I/O control board • CN105 on the PSU 2. Replace the hot roller fusing lamp if it is opened. 3. Replace the hot roller thermofuse if it is opened. 4. Check if the power supplied from the outlet fluctuates. 5. Replace the main control board, I/O control board, or PSU (check the trigger signal at each pin and replace any defective boards). - Signals to Check - • Hot roller fusing lamp trigger: CN303-B6 on main control board / CN205-A4, TP267, or CN218-B6 on I/O control board / CN106-5 on PSU.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC543	Hot roller fusing lamp overheat	- Timing - Every 1 second when the fusing unit is installed - Condition - The hot roller thermistor output is lower than about 0.3V, which corresponds to 220 °C, for 3 seconds continuously.	• Fusing unit not set properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board • Defective PSU		1. Check if the fusing unit is properly instaled. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the Temperature/ Resistance Conversion Reference Table at the end of this SC code table.) 5. Replace the main control board, I/O control board, or PSU (check the output from the thermistor and the trigger signal at each pin). - Signals to Check - • Thermistor: CN206-B9, TP231, or CN214-B1 on I/O control board / CN302-B9 or TP154 on main control board. • Hot roller fusing trigger: CN303-B6 on main control board / CN205-A4, TP267, or CN218-B6 on I/O control board / CN106-5 on PSU.	A
SC544	Hot roller fusing lamp lower limit temperature detected	- Timing - Every 1 second after warm-up is completed - Condition - The hot roller thermistor output is higher than about 3V, which corresponds to 87 °C, for 8 seconds continuously after warm-up is completed.	Same as SC543		Same as SC543	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC545	Hot roller ready temperature abnormal	- Timing - Every 1 second after the temperature reaches the ready condition - Condition - The hot roller thermistor output does not reach the ready temperature within 7 minutes.	Same as SC543		Same as SC543	A
SC547	Hot roller temperature does not increase	- Timing - Every 1 second, 2 minutes after the main switch turned on until the hot roller temperature reaches the ready condition - Condition - The hot roller temperature does not increase by more than 3 °C for a minute during warm-up.	• Poor connection of connectors • Hot roller fusing lamp blown • Hot roller thermofuse opened • Defective main control board • Defective I/O control board • Defective PSU		1. Check if the following connectors are properly connected; • Hot roller fusing lamp connectors • CN303 on the main control board • CN206 and CN214 on the I/O control board • CN105 on the PSU 2. Replace the hot roller fusing lamp if it is opened. 3. Replace the hot roller thermofuse if it is opened. 4. Replace the main control board, I/O control board, or AC drive board (check the trigger signal at each pin). - Signals to Check - • Hot roller fusing lamp trigger: CN303-B6 on main control board / CN205-A4, TP267, or CN218-B6 on I/O control board / CN106-5 on PSU.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC551	Pressure roller thermistor open	- Timing - Every 1 second after the fusing unit is installed - Condition - The pressure roller thermistor output is almost close to 5V, which corresponds to 0 °C, for 6 seconds continuously.	• Fusing unit not installed properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board		1. Check if the fusing unit is properly installed. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the Temperature/ Resistance Conversion Reference Table at the end of this SC code table.) 5. Replace the I/O control board. 6. Replace the main control board. - Signals to Check - • Thermistor: CN206-B4, TP230, or CN214-B2 on I/O control board / CN302-B8 or TP156 on main control board.	A
SC552	Pressure roller warm-up error	- Timing & Condition - The pressure roller thermistor does not output an analog value corresponding to the ready temperature within 12 minutes after the main switch is turned on.	• Poor connection of connectors • Pressure roller fusing lamp blown • Pressure roller thermofuse opened • Blown fuse • Power fluctuation • Defective main control board • Defective I/O control board • Defective PSU		1. Check if the following connectors are properly connected; • Pressure roller fusing lamp connectors • CN303 on the main control board • CN206 and CN214 on the I/O control board • CN105 on the PSU 2. Replace the pressure roller fusing lamp if it is opened. 3. Replace the pressure roller thermofuse if it is opened. 4. Check if the power supplied from the outlet fluctuates. 5. Replace the main control board, I/O control board, or PSU (check the trigger signal at each pin). - Signals to Check - • Pressure roller fusing lamp trigger: CN303-B7 on main control board / CN218-B5, TP267, or CN205-A5 on I/O control board / CN106-4 on PSU.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC553	Pressure roller overheat	- Timing - Every 1 second when the fusing unit is installed - Condition - The pressure roller thermistor output is lower than about 0.3V, which corresponds to 220 °C, for 3 seconds continuously.	• Fusing unit not installed properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board • Defective PSU		1. Check if the fusing unit is properly installed. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the Temperature/ Resistance Conversion Reference Table at the end of this SC code table.) 5. Replace the main control board, I/O control board, or PSU (check the output from the thermistor and the trigger signal at each pin). - Signals to Check - • Thermistor: CN206-B4, TP230, or CN214-B2 on I/O control board / CN302-B8 or TP156 on main control board. • Pressure roller fusing trigger: CN303-B7 on main control board / CN218-B5, TP267, or CN205-A5 on I/O control board /CN106-4 on PSU.	A
SC554	Pressure roller low limit temperature detected	- Timing - Every 1 second after warm-up is completed - Condition - The pressure roller thermistor output is higher than about 3 V, which corresponds to 87 °C, for 8 seconds continuously after warm-up is completed.	Same as SC553		Same as SC553	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC555	Pressure roller ready temperature abnormal	- Timing - Every 1 second after the temperature reaches the ready condition - Condition - The pressure roller thermistor output does not reach the ready temperature within 7 minutes continuously.	Same as SC553		Same as SC553	A
SC557	Pressure roller temperature does not increase	- Timing - Every 1 second, 2 minutes after the main switch turned on until the roller temperature reaches the ready condition - Condition - The pressure roller temperature does not increase by more than 3 °C for a minute during warm-up.	• Poor connection of connectors • Pressure roller fusing lamp brown • Pressure roller thermofuse opened • Defective main control board • Defective I/O control board		1. Check if the following connectors are properly connected: • Pressure roller fusing lamp connectors • CN303 on the main control board • CN206 and CN214 on the I/O control board 2. Replace the pressure roller fusing lamp if it is opened. 3. Replace the pressure roller thermofuse if it is opened. 4. Replace the main control board, I/O control board, or by checking the trigger signal at each pin. - Signals to Check - • Pressure roller fusing trigger: CN303-B7 on main control board / CN218-B5, or CN205-A5 on I/O control board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC558	Zero cross signal abnormal	- Timing & Condition - Zero cross signals generated within a certain period do not reach a predetermined number.	• Poor connection of connectors • Blown fuse • Defective PSU • Defective main control board • Defective I/O control board		1. Check if the following connectors are properly connected; • CN205 and CN218 on the I/O control board • CN303 on the main control board • CN106 on the PSU 2. Check the continuity of the signal lines of the above cables. 3. Replace the PSU, I/O control board, or main control board by checking the signal line at each pin. - Signals to Check - • Zero cross: CN106-3 on PSU/ CN205-A6, TP250, or CN218-B8 on I/O control board / CN303-B4 or TP170 on main control board	A
SC601	Scanner IPU communica-tion error	- Timing & Condition - After the main control board communicates successfully with the scanner IPU board once, a communication error is detected.	• Poor connection of connectors • Defective scanner IPU board • Defective main control board		1. Turn the main power switch off/on. 2. Check if the connectors (CN412 and CN407) are properly connected on the sub control board and scanner IPU board. 3. Replace the scanner IPU board. 4. Replace the main control board.	D
SC604	IDU communica-tion error	- Timing & Condition - No response is received from the IDU within 200 ms after the scanner IPU board sends a command and this error is detected 3 times in total.	• Poor connection between the IDU and scanner IPU board • Defective IDU board • Defective scanner IPU board		1. Check if the IDU board is properly connected to the scanner IPU board. 2. Replace the IDU board. 3. Replace the scanner IPU board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC620	ADF communication error	- Timing & Condition - After the main control board communicates successfully with the ARDF once, a communication error is detected.	• Poor connection or damaged cable • Defective ARDF main board • Defective main control board		1. Check that the cable is properly connected on the ADF main board and main control board or check if it is damaged. 2. Replace the ARDF main board. 3. Replace the main control board.	D
SC621	Sorter communication error	- Timing - Just after the main switch is turned on or while the sorter is running - Condition - The main control board detected a communication error with the sorter main board.	• Poor connection or damaged fibre-optic cable • Defective sorter main board • Defective main control board		1. Check that the fibre-optic cable is properly connected on the sorter main board and main control board or check if it is damaged. 2. Replace the sorter main board. 3. Replace the main control board.	D
SC625	FPU communication error	- Timing & Condition - The scanner IPU board detected a communication error with the FPU while the FPU is operating or after the FPU completes the operation.	• Poor connection or damaged fibre-optic cable • Defective FPU main board • Defective scanner IPU board		1. Check that the fibre-optic cable is properly connected on the FPU main board and main control board or check if it is damaged. 2. Replace the FPU main board. 3. Replace the scanner IPU board.	B
SC626	Paper tray unit communication error	- Timing - Just after the main switch is turned on or while the paper tray unit is running - Condition - The main control board detected a communication error with the paper tray unit.	• Poor connection or damaged cables • Defective CSS/bank interface board • Defective paper tray unit control board • Defective main control board		1. Check that the cables are properly connected on the main control board, CSS/bank interface board, and paper tray unit control board or check if the cables are is damaged. 2. Replace CSS/bank interface board. 3. Replace the paper tray unit control board. 4. Replace the main control board.	B

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC630	RDS communica-tion error	- Timing & Condition - The main control board receives no response from RDS when accessing it. Even when this error is detected, the copier does not show the SC code and this SC code is not logged. (Copier functions are still working.)	• Poor connection or damaged cable • Defective line adapter • Defective CSS/bank interface board • Defective main control board		1. Check that the cables are properly connected on the CSS/bank interface board and main control board or check if the cables are damaged. 2. Check and/or change the setting of the line adapter or replace it. 3. Replace the CSS/bank interface board. 4. Replace the scanner IPU board.	
SC690	Application selection error	- Timing & Condition - When the main CPU communicates with CPUs on other PCBs, the main CPU does not receive response from the others.	• Scanner IPU firmware upgrade • Poor connection of connectors • Defective scanner IPU board • Defective main control board • Main boards of options		• If this SC code is displayed after the scanner IPU firmware is changed, the IC card may still be in the slot. Turn the main switch off and on after removing the IC card. 1. Check if the connectors on the main control board, scanner IPU board, and the main board on each option are properly connected. 2. Replace the defective boards.	B
SC720	Sorter main motor error	The main motor pulse output state remains unchanged for 300 ms at start time, or for 100 ms during operation.	Defective motor		Defective motor: Test with SP5-804-120. Replace if necessary.	D
SC721	Sorter bin motor error	The bin HP sensor has not turned off 2,550 ms after the bin goes up from the home position.	Defective sensor (including connectors), defective motor, or motor overload		Defective bin HP sensor: Check connections. Test using SP5-803-124/125 (input check: bin home/bin rotation). Replace the sensor if necessary. Overload: Check the mechanism, including the gears. Defective bin drive motor: Test with SP5-804-124. Replace if necessary.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC722	Sorter jogger motor error	The jogger does not return to its home position within the specified time. The jogger does not leave home position within the specified time.	Defective jogger HP sensor (including connectors), defective jogger motor		Defective jogger HP sensor: Check the connections. Test with SP5-803-128. Replace if necessary. Defective jogger motor: Test with SP5-804-131. Replace if necessary.	D
SC724	Sorter grip motor error	The grip HP sensor does not go off within 3,200 ms during travel out of home position. The grip HP sensor does not go on within 3,200 ms during return to home position.	Defective grip HP sensor (including connectors), defective grip motor		Defective grip HP sensor: Check connections. Test with SP5-803-129. Replace if necessary. Defective grip motor: Test with SP5-804-127. Replace if necessary.	D
SC725	Sorter stapler motor error	The stapler HP sensor cannot detect the home position within the specified time (700 ms) after the stapler motor is turned on.	Staple jam, overload due to too many staples, or defective stapler motor		Staple jam: Check. Overload due to too many staples: Check. Defective stapler motor: Test with SP5-804-129. Replace if necessary.	B
SC731	Sorter tray shift motor error	The sorter self-diagnostics detect a tray shift motor error and notify the main control board. Detection timing: Just after power is turned on or when the sorter is running	Defective tray shift motor or overload		Motor overload: Check the mechanism, including the gears. Defective motor: Test with SP5-804-132. Replace if necessary.	D
SC732	Sorter tray lift motor error	The sorter self-diagnostics detect a tray lift motor error and notify the main control board. Detection timing: Just after power is turned on or when the sorter is running	Defective tray lift motor		Defective tray lift motor: Test with SP5-804-124. Replace if necessary. Defective sorter control board: Replace.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SCs	Troubleshooting Procedure	Type
SC741	Optional paper tray unit error	The paper tray unit self-diagnostics detect an error and notify the main control board. Detection timing: Just after power is turned on or when the paper tray unit is running.	Defective paper tray unit control board		Defective paper tray unit control board: Replace.	B
SC790	Projector lamp on error	- Timing & Condition - The projector lamp does not turn on 100 ms after 5V is applied to it.	• Poor connection of connector • Blown projector lamp • Defective projector main board		1. Check if the connector is properly connected. 2. Replace the projector lamp if it is blown. 3. Replace the projector main board.	B
SC791	Projector lamp off error	- Timing & Condition - The projector lamp does not turn off 100 ms after it is turned off.	• Defective projector main board • Defective scanner IPU board • Defective main control board		Replace the projector main board. Replace the scanner IPU board. Replace the main control board.	B
SC792	Projector lamp overheated	- Timing & Condition - The projector lamp overheats during projector operation.	• Poor connection of connector • Defective thermistor • Defective projector main board		1. Check if the connector of the fan is properly connected. 2. Replace the fan if it is defective. 3. Replace the thermistor if it is defective. 4. Replace projector main board.	B

Temperature/Resistance Conversion Reference Table

Relationship between the fusing thermistor resistances and temperatures

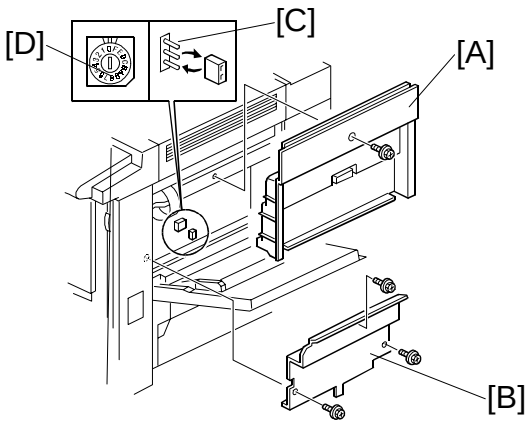
Temperature	Lower-limit Value	Standard Value	Upper-limit Value
0	211.7	329.3	398.9
10	166.8	198.9	236.9
20	105.4	123.7	145.1
30	68.4	79.11	91.44
40	45.45	51.86	59.14
50	30.88	34.78	39.16
60	21.4	23..833	26.51
70	15.12	16.64	18.3
80	10.87	11.83	12.88
90	7.935	8.554	9.216
100	5.881	6.281	6.703
110	4.42	4.678	4.948
120	3.365	3.531	3.703
130	2.593	2.699	2.807
140	2.021	2.087	2.154
150	1.592	1.632	1.672
160	1.249	1.289	1.33
170	0./9849	1.0228	1.068
180	0.7912	0.8276	0.8652
190	0.6834	0.6719	0.7067
200	0.5184	0.5499	0.5818

APPENDIX-4

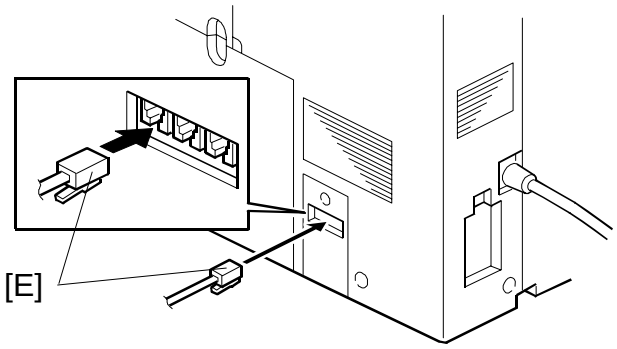
RSS (Remote service system)

1. RSS (REMOTE SERVICE SYSTEM)

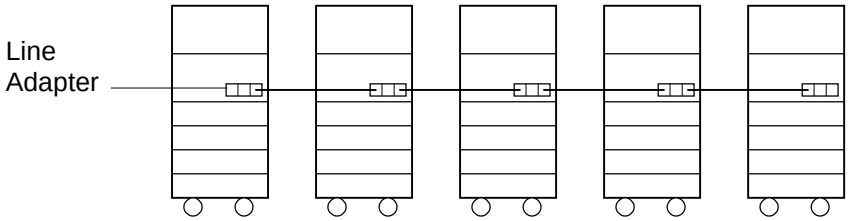
1.1 RSS SET UP



A259I303.WMF



A259I302.WMF



A259I304.WMF

Machine No.	1	2	3	4	5
Jumper set	2-3	2-3	2-3	2-3	1-2
PI device code	0	1	2	3	4

⚠CAUTION

Unplug the machine power cord before starting the following procedure.

NOTE: When connecting only one machine to the line adapter, start from step 6.

1. Remove the right cover [A] (1 screw).
2. Remove the shield cover [B] (3 screws) (A259/A260 only).
3. Set the jumper TB104 [C] on the main control board as shown (default setting is 1-2).
4. Set the PI device code with SW101 [D] on the main control board (default 0).
5. Reinstall covers.
6. Turn on the main power switch.
7. Connect the modular cord [E] to the left modular connector, as shown.
8. Install the line adapter (refer to chapter 2-1 L-ADP Installation Procedure in the CSS L-ADP Service Manual).

1.2 SP MODE SETTING

After installing the machine and line adapter, set SP5-816-000 [RDS On/Off] to 1.

Check and set the value of the following SP modes. Ensure they are set correctly.

- SP5-501-000 [Set PM Counter]: 60000 developments (Default)
- SP5-504-000 [Jam Alarm Level]: 3=1000 sheets (Default)
- SP5-505-000 [SC Alarm Level]: 10=1000 sheets (Default)
- SP5-507 [Supply Alarm Level]: Specifies whether the following supply call is performed or not.
  - -001 [Toner End]: 0= No (Default), 1= Yes
  - -002 [Count of Copy]: 0= No (Default), 1= Yes
    When the size counter becomes the following setting values (from SP5-507-131 to 166), the machine sends an alarm to the center.
  - -003 [Staple]: 0= No (Default), 1= Yes

  - -131 [A2]: 1000 sheets (Default) (Set the counter value for the alarm.)
  - -132 [A3]: 1000 sheets (Default)
  - -133 [A4]: 1000 sheets (Default)
  - -134 [A5]: 1000 sheets (Default)
  - -140 [B3]: 1000 sheets (Default)
  - -141 [B4]: 1000 sheets (Default)
  - -142 [B5]: 1000 sheets (Default)
  - -143 [B6]: 1000 sheets (Default)
  - -160 [DLT]: 1000 sheets (Default)
  - -164 [LG]: 1000 sheets (Default)
  - -166 [LT]: 1000 sheets (Default)
- SP5-508-000 [CC Auto Call On/Off]: 1 = On (Default), 0 = off
- SP5-812-000 [Service Tel. No.] Set service engineer phone number

1.3 CHECKING ITEMS USING RSS

1.3.1 READ ONLY ITEMS

Item	
Paper End for each Tray (By-pass, 1st, 2nd, 3rd, 4th)	
Staple End	
Toner Near End for each color (K,Y,M,C)	
Door Open: Front cover, Vertical transport door, Paper exit door, Transport guide plate (for Paper Tray Unit), Sorter (door switch)	
Jammed Paper Position	
Machine Condition (1: Warming up, 2: Ready, 3: Copying, 4: Abnormal, 5: Adjustment or Calibration, 6: UP Mode, 7: SP Mode)	
Paper Size Information (By-pass, 1st, 2nd, 3rd, 4th)	
Total Counter: Full Color	
Total Counter: Bk	
User Code: Total Max. Number	
User Code: Total Current Number	
Power On Timer (hour)	
SP1-106-001	[Pressure Roller Temperature]
SP1-106-002	[Hot Roller Temperature]
SP3-111-000	[Residual Voltage]
SP7-401	[Total SC]
SP7-402	[SC History] [SC code (3 digits) + FC counter (last 4 digits) + K Counter (last 4 digits)]
SP7-502	[Total Paper Jam]
SP7-503	[Total Original Jam]
SP7-504	[Jam Counter] (each location)
SP7-505	[Original Jam Counter] (each location)
SP7-801	[ROM Version] (for Main, Scanner, IDU, ADF, Sorter, Paper Tray, FPU)
SP7-803	[PM Counter]

1.3.2 CALL AND READ ITEMS

Item
PM Alarm
SC Alarm
Jam Alarm
Used Toner Tank Alarm
Fusing Oil End Alarm
Continuously Jams Auto Call
Long Time Jam Condition Auto Call (more than 15 minuets)
Continuously Cover Open Auto Call (more than 15 minuets)
SC Auto Call
Manual Call: PM Start
Manual Call: PM End
Manual Call: User Call
Emergency Supply Auto Call: Staple
Emergency Supply Auto Call: each toner
Emergency Supply Auto Call: Paper (for each size)

1.3.3 READ AND WRITE ITEMS

Item	
Max. Copy Q'ty setting (User Tool)	
Function Reset setting (User Tool)	
Control Panel Off setting (User Tool)	
Auto Timer setting (User Tool)	
Auto Tray Switch setting (User Tool)	
A.D.S. (FC) setting (User Tool: Image Adjustment)	
A.D.S. (B&K/SC) setting (User Tool: Image Adjustment)	
SADF Auto Reset setting (User Tool)	
ADF Mixed Sizes (User Tool)	
Auto Sort Mode (User Tool)	
Total Counter: FC	
Total Counter: K	
SP1-001	[Lead Edge Regist]
SP1-002	[Side-to-side Regist]
SP1-003	[Paper Feed Timing]
SP2-101	[Blank Margin]
SP5-104	[A3/DLT Double Count]
SP5-501	[Set PM Counter]
SP5-504	[Jam Alarm Level]
SP5-505	[SC Alarm Level]
SP5-507	[Supply Alarm Level]
SP5-508	[CC Auto Call On/Off]
SP5-811	[Serial No.]
SP5-812	[Service Tel. No.]

1.3.4 EXECUTE ITEMS

Item	
SP2-207	[Forced toner supply] (K, C, M, Y)
SP5-810-000	[SC Reset]
SP7-804-001	[1PM Parts Counter Clear]
SP7-804-002	[2PM Parts Counter Clear]
SP7-804-003	[PM Counter Clear]
SP7-807-000	[SC/Jam Counter Clear]
SP7-808-000	[All Counter Clear]
SP7-810-000	[All Copy Counter Clear]

1.4 OTHERS

Manual call procedure

1. Press the ⌧ key.
2. Press the ⓪ key on the numeric keypad twice.
3. Press and hold the Ⓒ/⊘ key for 3 seconds.

[A258 only]

4. The machine automatically call to the CSS center. To return to the normal operation screen, press ⌧ key.

[A259/A260 only]

4. Press the Call button. The message “Please Wait” appears.
5. To return to the normal operation screen, press the End button.

SC630 [RDS Communication Error]

If SC630 conditions occur frequently, they are due to errors in the customer's L-ADP or communication line. It is necessary to make planned inspections to maintain the communications environment in good working condition.

PM Procedure or other maintenance

Before starting the PM procedure or other maintenance, set SP5-817-000 to 1 to inform the CSS center and to disable the RDS function.

If you do not reset SP5-817-000, the machine automatically goes back to 0 after 4 hours. When you continue maintenance, you might need to set SP5-817-000 to 1 again.

After finishing maintenance, reset SP5-817-000 to 0 to enable the RDS function and inform the CSS center.

Printed Circuit Boards

Symbol	Name	Function	Fig. No.-Index No.	Location
PCB1	PSU	Supplies AC and DC power.	7-4	K4
PCB 2	Lamp regulator	Supplies AC power to the exposure lamp.	1-6	O7
PCB3	SBU	Converts the light reflected from the original into video signals.	1-8	J9
PCB4	Scanner IPU board	Converts the RGB image signal from the CCD to a KCMY signal and sends it to the LD main control board.	1-9	L8
PCB 5	Scanner motor drive board	Supplies DC power to the scanner motor.	1-1	M7
PCB6	I/O control board	Interfaces the sensors, clutches, solenoids, and motors in the printer module with the main control board.	7-11	D14
PCB7	High voltage supply board: C, G	Supplies power to the charge corona wire and grid.	7-1	A14
PC8	High voltage supply board: T1, PCC	Supplies power to the transfer belt and pre-cleaning corona unit.	7-9	A2
PCB9	High voltage supply board: T2, D	Supplies power to the paper transfer bias roller and paper separation corona unit.	7-5	A1
PCB10	High voltage supply board: B	Supplies power to the development rollers.	5-9	A3
PCB11	Main control board	Controls the printer sequence.	1-10	J12
PCB12	Laser synchronizing detector board 1	Detects laser main scan synchronization while the latent image is being written to the drum.	1-16	O15
PCB13	Laser synchronizing detector board 2	Detects laser main scan synchronization while the latent image is being written to the drum.	1-12	O15
PCB14	Revolver motor drive board	Controls the revolver motor.	7-7	F5
PCB15	Interface board: CSS/Bank	Connects to the CSS unit and optional paper tray unit.	7-6	J9
PCB16	LD drive board	Drives the laser diode.	1-15	O17
PCB17	LD main control board	Controls the laser power, main scan synchronizing sensors, and process control gamma correction.	1-11	M16
PCB18	By-pass paper width detection board	Detects the paper width on the by-pass feed table.	3-7	A10
PCB19	Operation panel board	Used to operate the copier.	4-1	H19
PCB20	Duplex control board	Controls the duplex unit.	4-18	F20 (A259/A260 copiers only)
PCB21	IDU	Analyzes images for anti-counterfeiting.	1-4	M14
PCB22	Polygon mirror motor drive board	Controls the polygon mirror motor.	1-13	O15
PCB23	Temperature and humidity sensor board	Detects the ambient temperature and humidity.	3-16	E19

Motors

Symbol	Name	Function	Fig. No.-Index No.	Location
M1	Scanner motor	Drives the scanner.	1-2	M6
M2	Polygon mirror motor	Drives the polygon mirror (laser unit).	1-14	O15
M3	Revolver drive motor	Rotates the revolver unit.	6-3	G5
M4	Duplex feed motor	Drives the paper feed roller in the duplex unit.	4-14	G20 (A259/A260 copiers only)
M5	Duplex Side fence jogger motor	Drives the duplex unit side fences.	4-16	G21 (A259/A260 copiers only)
M6	Duplex End fence jogger motor	Drives the duplex unit end fences.	4-17	G21 (A259/A260 copiers only)
M7	Paper feed motor	Drives the paper feed unit.	3-2	A12
M8	Tray lift motor	Lifts the tray bottom plate.	6-8	A12 (A258 models only)
M9	Toner supply motor	Supplies toner.	6-2	A7
M10	Drum motor	Drives the drum, the development unit currently at the development position, and the transfer belt.	6-9	A19
M11	Fusing motor	Drives the transport and fusing units.	6-5	E8

Fan Motors

Symbol	Name	Function	Fig. No.-Index No.	Location
FM1	Transport fan	Attracts copy paper to the transport belt.	2-11	A11
FM2	Optics cooling fan	Cools the scanner unit	1-20	O14
FM3	Charge corona fan	Cools the charge corona unit.	5-5	A6
FM4	Scanner exhaust fan	Cools the scanner unit.	1-7	P7
FM5	Fusing unit fan	Cools the fusing unit.	7-3	E1
FM6	Main exhaust fan	Sucks air from the charge and transfer areas out of the machine.	7-10	A17
FM7	Rear cooling unit fan	Cools the rear section of the copier.	7-2	E10
FM8	PSU fan	Cools the PSU.	7-12	A7

Sensors

Symbol	Name	Function	Fig. No.-Index No.	Location
S1	Toner end sensor	Detects the presence or absence of toner in a cartridge.	5-8	A4
S2	Toner cartridge sensor	Detects the presence or absence of toner cartridges.	5-6	A4
S3	Revolver H.P. sensor	Detects if the revolver is at the home position.	5-7	A4
S4	Potential sensor	Detects the potential of the drum surface.	5-10	A5
S5	ID sensor	Detects the density of toner on the developed ID sensor patch on the drum.	5-4	A5
S6	Belt cleaning H.P. sensor	Detects if the belt cleaning unit is at the home position.	2-2	A8
S7	By-pass feed paper end sensor	Detects if there is paper on the by-pass feed table.	3-13	A8
S8	Upper limit sensor	Detects the upper limit position of the tray bottom plate.	3-10	A13 (A258 models only)
S9	Relay sensor	Detects paper jams at the relay section.	3-12	A13 (A258 models only)
S10	Tray paper end sensor	Detects if there is paper in the paper feed tray.	3-11	G13 (A258 models only)
S11	Relay Sensor	Detects a paper jam at the relay section	3-12	A14 (A259/A260 models only)
S12	Used toner sensor	Detects if the used toner tank is full	7-8	A15
S13	Paper transfer H.P. sensor	Detects if the paper transfer unit is at the home position.	2-8	A15
S14	Paper height sensor 1	Detects the amount of paper in the tray.	2-6	A16 (A258 models only)
S15	Paper height sensor 2	Detects the amount of paper in the tray.	2-7	A16 (A258 models only)
S16	Transfer belt H.P. sensor	Detects the mark on the transfer belt.	2-4	A18
S17	Registration H.P. sensor	Detects paper jams at the registration section.	3-15	A19
S18	Paper exit sensor	Detects paper jams at the paper exit.	4-5	F1
S19	Oil end sensor	Detects if there is silicone oil in that tank.	4-6	G1
S20	Original length sensor	Detects the length of the original.	1-5	N7
S21	Platen cover position sensor	Detects if the platen cover is opened or closed.	1-3	O7
S22	Original length sensor-sub	Detects the length of the original	1-23	P7
S23	Scanner H.P. sensor	Detects the scanner home position.	1-21	P14
S24	Original width sensor	Detects the width of the original.	1-18	P14

Symbol	Name	Function	Fig. No.-Index No.	Location
S25	Side fence jogger HP sensor	Detects the home position of the duplex unit side fence.	4-15	G22 (A259/A260 models only)
S26	End fence jogger HP sensor	Detects the home position of the duplex unit end fence.	4-19	G22 (A259/A260 models only)
S27	Duplex paper end sensor	Detects if there is paper in the duplex unit.	4-13	G22 (A259/A260 models only)
S28	Duplex entrance sensor	Detects when copy paper comes into the duplex unit.	4-11	G23 (A259/A260 models only)
S29	Duplex turn sensor	Detects when copy paper is being reversed in the duplex unit.	4-12	G23 (A259/A260 models only)

Switches

Symbols	Name	Function	Fig. No.-Index No.	Location
SW1	Main power switch	Turns the power to the copier on or off.	2-1	M1
SW2	Front door switch	Cuts the DC line to the high voltage supply board when the front door is open.	2-12	E11
SW3	Paper exit door switch	Detects if the paper exit door is open or closed.	2-13	A7 (A259/A260 models only)
SW4	By-pass feed table switch	Detects if the by-pass feed table is open or closed.	3-14	A8
SW5	Paper tray detector switch	Detects the presence or absence of a paper tray.	2-3	A16 (A258 models only)
SW6	Vertical transport switch	Detects if the vertical transport door is open or closed.	3-8	A17

Clutches

Symbols	Name	Function	Fig. No.-Index No.	Location
CL1	By-pass feed clutch	Transmits drive to the by-pass feed mechanism.	3-5	A9
CL2	Paper feed clutch	Transmits drive to the paper feed mechanism.	3-6	A17
CL3	Registration clutch	Transmits drive to the registration rollers.	3-3	A18
CL4	Paper transfer positioning clutch	Transmits drive to the paper transfer unit.	3-1	A11
CL5	Development clutch	Transmits drive to the development mechanism.	6-1	E3
CL6	Relay clutch	Transmits drive to the relay rollers.	3-4	A18
CL7	Belt cleaning clutch	Transmits drive to the belt cleaning unit.	6-7	E2

Symbols	Name	Function	Fig. No.-Index No.	Location
CL8	Fusing clutch	Transmits drive to the fusing unit.	6-6	E1
CL9	Belt lubricant clutch	Transmits drive to the belt lubricant mechanism.	6-4	E2

Solenoids

Symbols	Name	Function	Fig. No.-Index No.	Location
SOL1	By-pass pickup solenoid	Lowers the by-pass pick-up roller.	3-9	A9
SOL2	Junction gate solenoid	Raises the junction gate for the duplex tray.	2-14	A7 (A259/A260 copiers only)

Lamps

Symbol	Name	Function	Fig. No.-Index No.	Location
L1	Hot roller fusing lamp	Provides heat to the hot roller.	4-7	H1
L2	Pressure roller fusing lamp	Provides heat to the pressure roller.	4-4	G1
L3	Exposure lamp	Applies high intensity light to the original for exposure.	1-19	O5
L4	Quenching lamp	Neutralizes any charge remaining on the photoconductor.	5-2	A6

Heaters

Symbol	Name	Function	Fig. No.-Index No.	Location
H1	Paper transfer unit heater	Prevents moisture from forming around the paper transfer unit.	2-9	J1
H2	Transfer belt heater	Used to stabilize the temperature around the transfer belt.	2-5	K1
H3	Optics anti-condensation heater	Prevents moisture from forming on the optics.	1-17	L1

Thermistors

Symbol	Name	Function	Fig. No.-Index No.	Location
TH1	Pressure roller thermistor	Controls the temperature of the pressure roller.	4-9	F1
TH2	Hot roller thermistor	Controls the temperature of the hot roller.	4-6	G1

Thermofuses

Symbol	Name	Function	Fig. No.-Index No.	Location
TF1	Hot roller thermofuse	Protects the hot roller from overheating.	4-8	H1
TF2	Pressure roller thermofuse	Protects the pressure roller from overheating.	4-3	H1

Thermostat

Symbol	Name	Function	Fig. No.-Index No.	Location
TS1	Thermostat	Prevents the exposure lamp from overheating when it is on for a long time.	1-22	O6

Counter

Symbol	Name	Function	Fig. No.-Index No.	Location
CO1	Upper mechanical counter	Indicates the total number of development cycles made using the C, M, and Y development units;	2-10	A9
CO2	Lower mechanical counter	Shows the total number of black developments.	2-10	A10

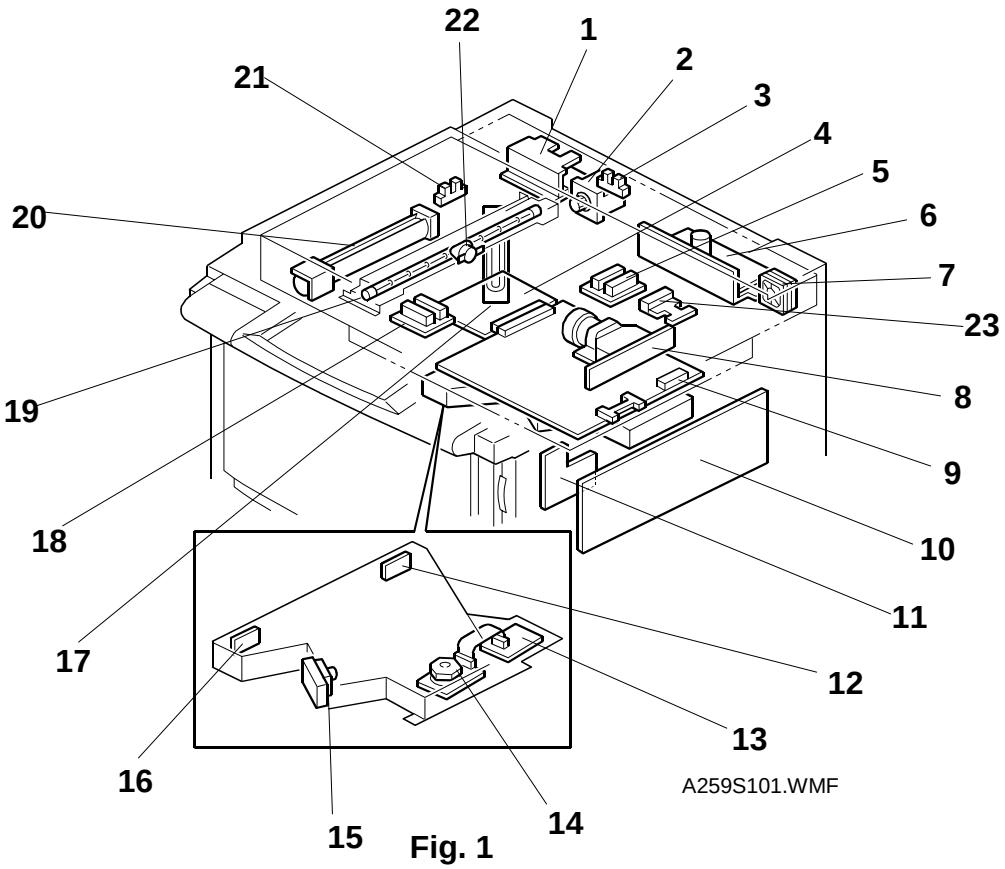


Fig. 1

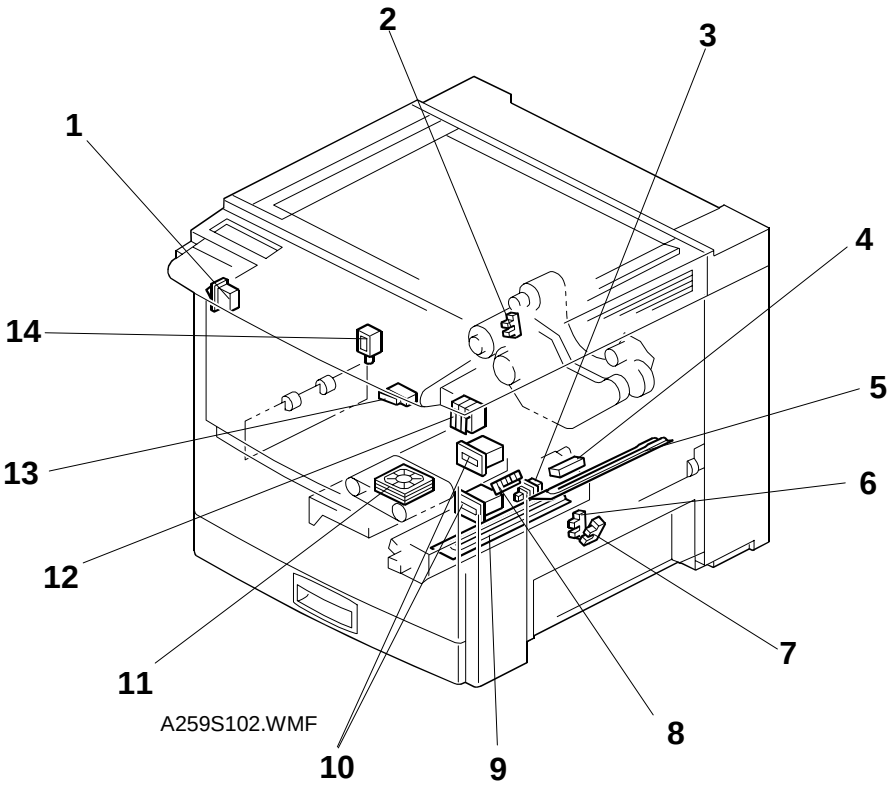


Fig. 2

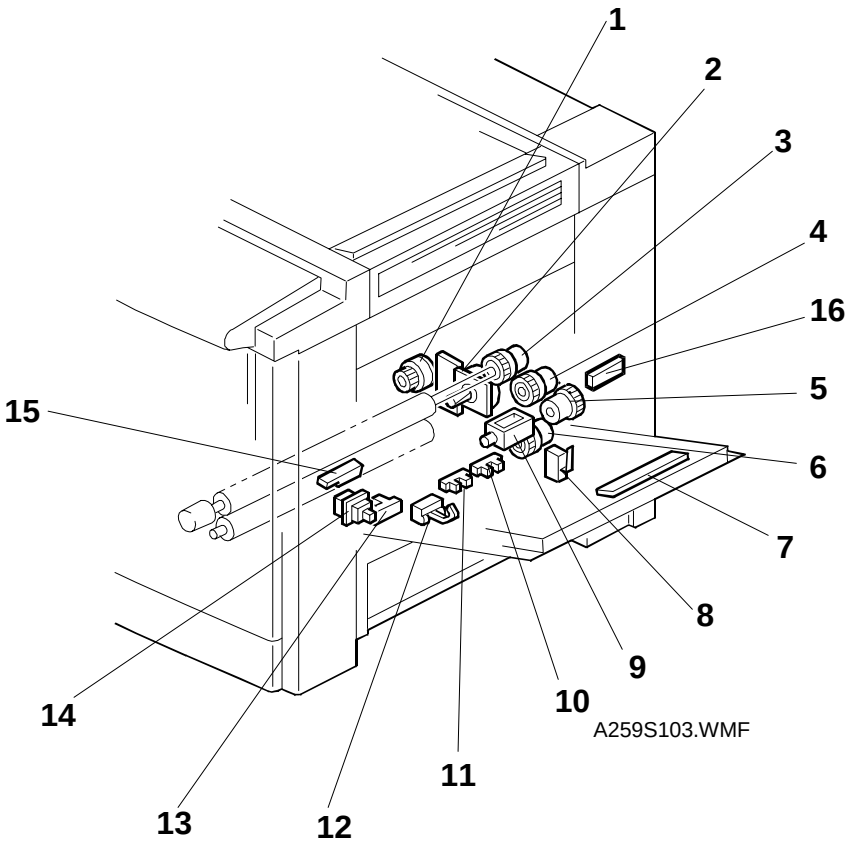


Fig. 3

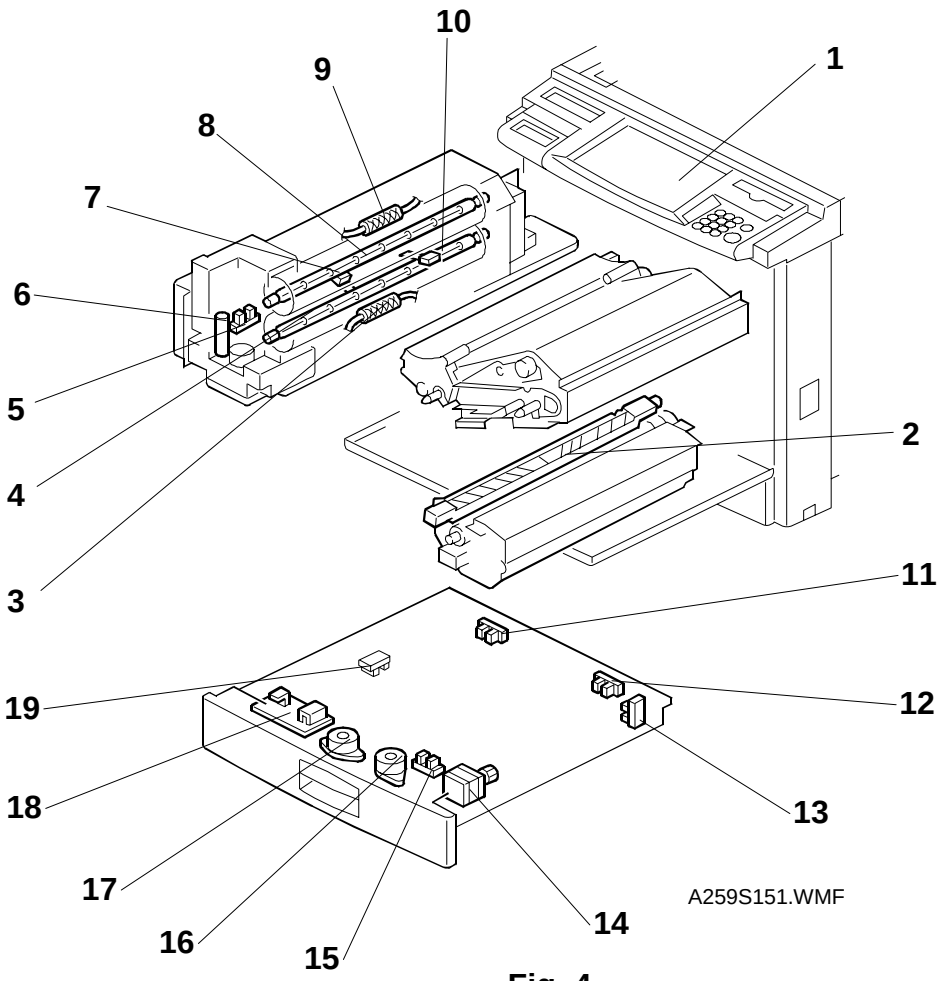


Fig. 4

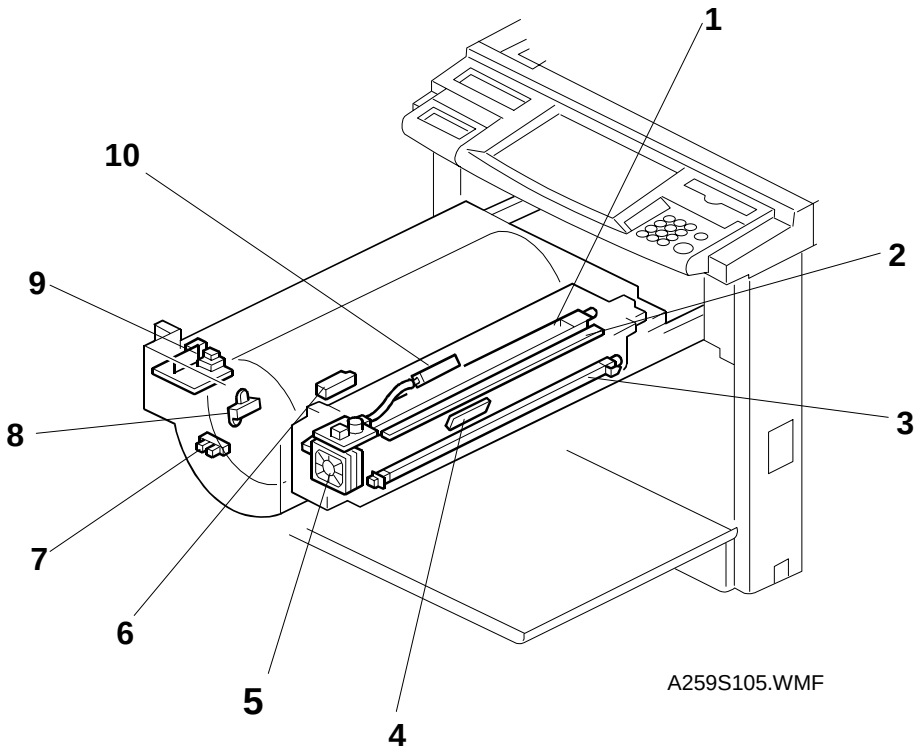


Fig. 5

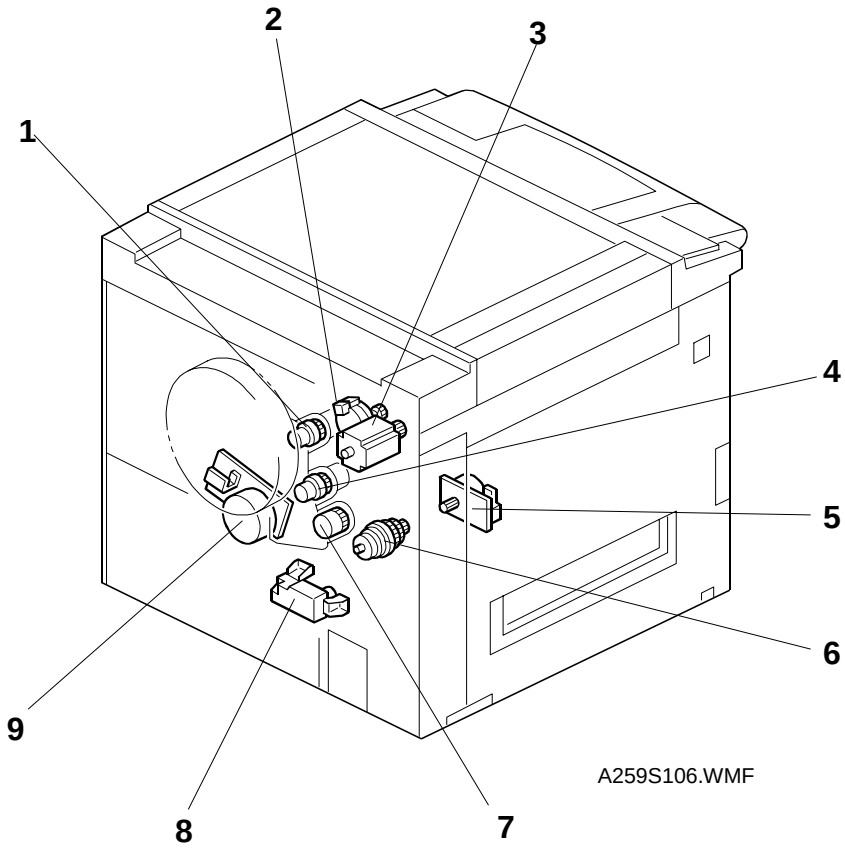


Fig. 6

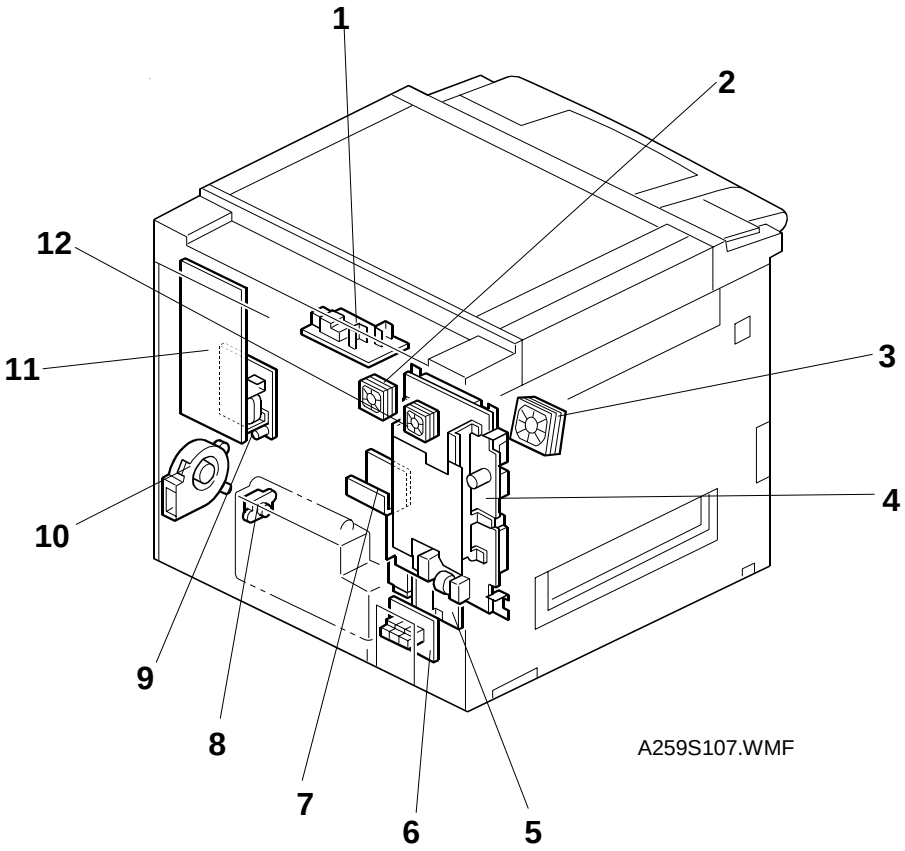
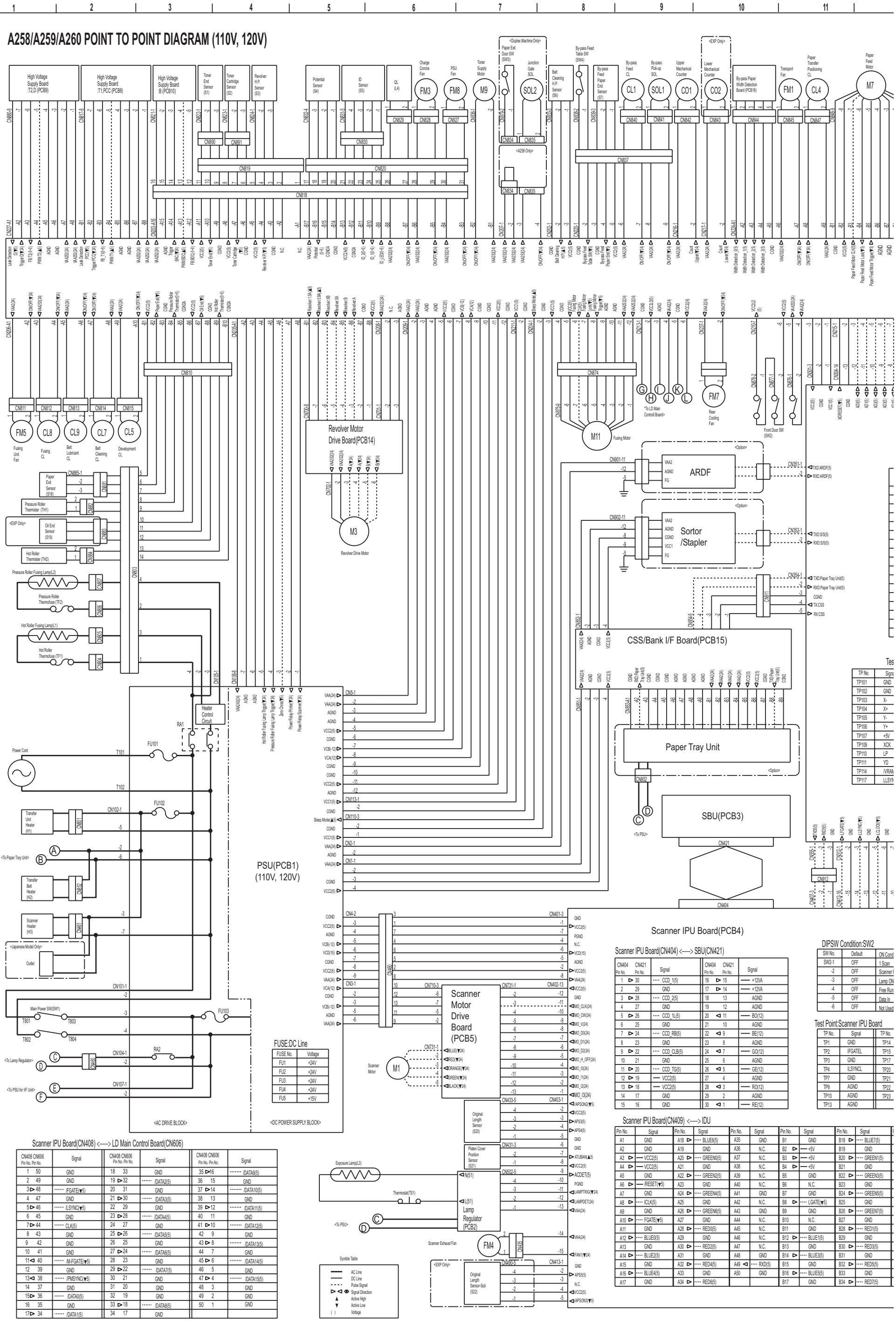


Fig. 7

A258/A259/A260 POINT TO POINT DIAGRAM (110V, 120V)



FUSE:DC Line

FUSE No.	Voltage
FU1	+24V
FU2	+24V
FU3	+24V
FU4	+24V
FU5	+15V

Scanner IPU Board(CN408) <---> LD Main Control Board(CN606)

CN408 CN606 Pin No. Pin No.	Signal	CN408 CN606 Pin No. Pin No.	Signal	CN408 CN606 Pin No. Pin No.	Signal
1 50	GND	18 33	GND	35 ▷16	····· /DATA9(5)
2 49	GND	19 ▷32	····· /DATA2(5)	36 15	GND
3 ▷48	····· /FGATE(▼5)	20 31	GND	37 ▷14	····· /DATA10(5)
4 47	GND	21 ▷30	····· /DATA3(5)	38 13	GND
5 ▷46	····· /LSYNC(▼5)	22 29	GND	39 ▷12	····· /DATA11(5)
6 45	GND	23 ▷28	····· /DATA4(5)	40 11	GND
7 ▷44	····· CLK(5)	24 27	GND	41 ▷10	····· /DATA12(5)
8 43	GND	25 ▷26	····· /DATA5(5)	42 9	GND
9 42	GND	26 25	GND	43 ▷ 8	····· /DATA13(5)
10 41	GND	27 ▷24	····· /DATA6(5)	44 7	GND
11◁ 40	····· /M-FGATE(▼5)	28 23	GND	45 ▷ 6	····· /DATA14(5)
12 39	GND	29 ▷22	····· /DATA7(5)	46 5	GND
13◁ 38	····· /PMSYNC(▼5)	30 21	GND	47 ▷ 4	····· /DATA15(5)
14 37	GND	31 20	GND	48 3	GND
15▷ 36	····· /DATA0(5)	32 19	GND	49 2	GND
16 35	GND	33 ▷18	····· /DATA8(5)	50 1	GND
17▷ 34	····· /DATA1(5)	34 17	GND		

Scanner IPU Board(CN404) <---> SBU(CN421)

CN404 Pin No.	CN421 Pin No.	Signal	CN404 Pin No.	CN421 Pin No.	Signal
1 ▷	30	····· CCD_1(5)	16 ▷	15	—— +12VA
2	29	GND	17 ▷	14	—— +12VA
3 ▷	28	····· CCD_2(5)	18	13	AGND
4	27	GND	19	12	AGND
5 ▷	26	····· CCD_1L(5)	20 ◁	11	—— BO(12)
6	25	GND	21	10	AGND
7 ▷	24	····· CCD_RB(5)	22 ◁	9	—— BE(12)
8	23	GND	23	8	AGND
9 ▷	22	····· CCD_CLB(5)	24 ◁	7	—— GO(12)
10	21	GND	25	6	AGND
11 ▷	20	····· CCD_TG(5)	26 ◁	5	—— GE(12)
12 ▷	19	—— VCC2(5)	27	4	AGND
13 ▷	18	—— VCC2(5)	28 ◁	3	—— RO(12)
14	17	GND	29	2	AGND
15	16	GND	30 ◁	1	—— RE(12)

DIPSW Condition:SW2

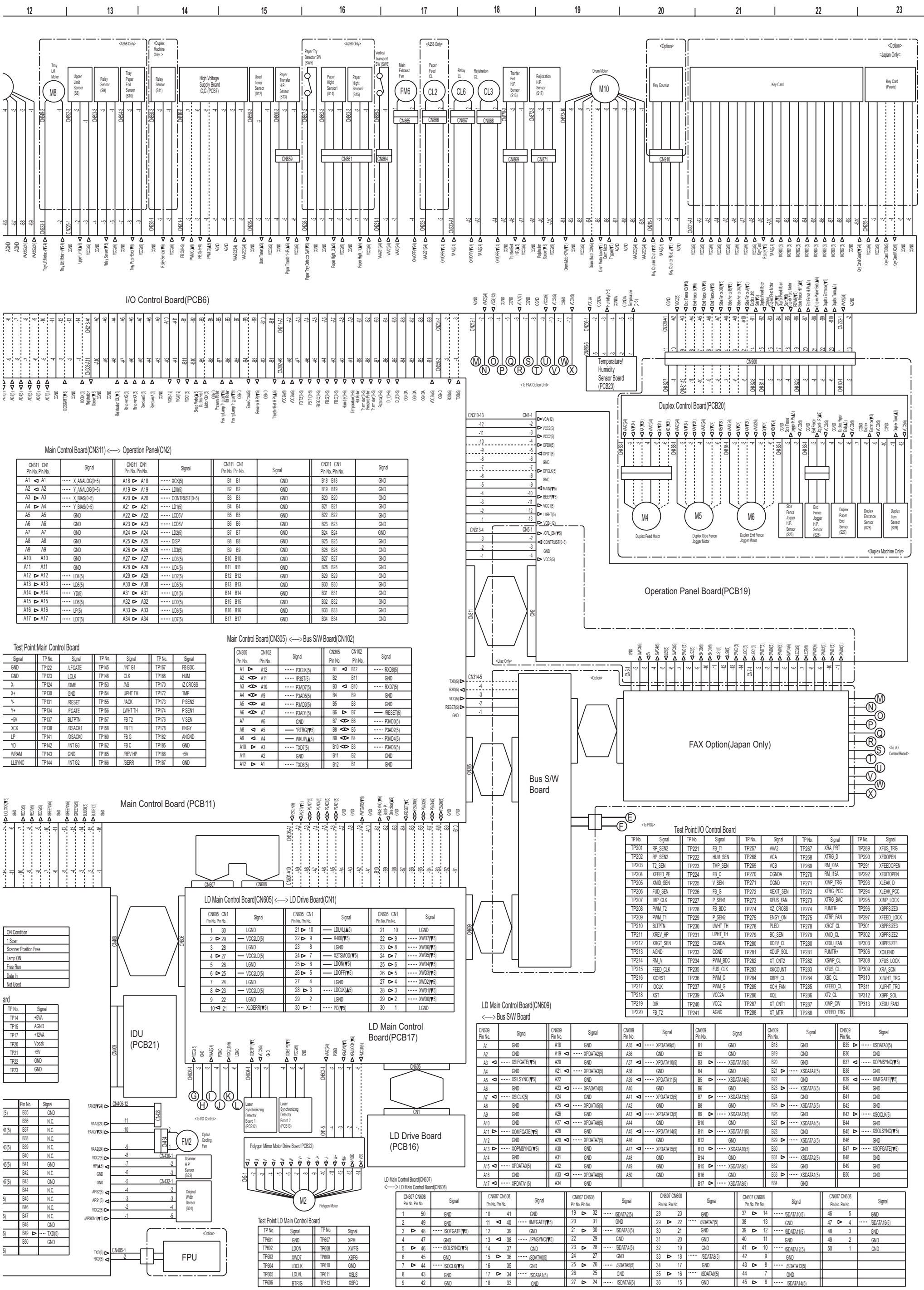
SW No.	Default	ON Cond
SW2-1	OFF	1 Scan
-2	OFF	Scanner I
-3	OFF	Lamp ON
-4	OFF	Free Run
-5	OFF	Data In
-6	OFF	Not Used

Test Point:Scanner IPU Board

TP No.	Signal	TP No.
TP1	GND	TP14
TP2	IFGATEL	TP15
TP3	GND	TP17
TP4	ILSYNCL	TP20
TP7	GND	TP21
TP9	AGND	TP22
TP10	AGND	TP23
TP13	AGND	

Scanner IPU Board(CN409) <---> IDU

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
A1	GND	A18 ▷	···· BLUE6(5)	A35	GND	B1	GND	B18 ▷	···· BLUE7(5)
A2	GND	A19	GND	A36	N.C.	B2 ▷	—— +5V	B19	GND
A3 ▷	—— VCC2(5)	A20 ▷	···· GREEN0(5)	A37	N.C.	B3 ▷	—— +5V	B20 ▷	···· GREEN1(5)
A4 ▷	—— VCC2(5)	A21	GND	A38	N.C.	B4 ▷	—— +5V	B21	GND
A5	GND	A22 ▷	···· GREEN2(5)	A39	N.C.	B5	GND	B22 ▷	···· GREEN3(5)
A6 ▷	—— /RESET(▼5)	A23	GND	A40	N.C.	B6	N.C.	B23	GND
A7	GND	A24 ▷	···· GREEN4(5)	A41	GND	B7	GND	B24 ▷	···· GREEN5(5)
A8 ▷	···· ICLK(5)	A25	GND	A42	N.C.	B8 ▷	···· LGATE(▼5)	B25	GND
A9	GND	A26 ▷	···· GREEN6(5)	A43	GND	B9	GND	B26 ▷	···· GREEN7(5)
A10 ▷	···· FGATE(▼5)	A27	GND	A44	N.C.	B10	N.C.	B27	GND
A11	GND	A28 ▷	···· RED0(5)	A45	N.C.	B11	GND	B28 ▷	···· RED1(5)
A12 ▷	···· BLUE0(5)	A29	GND	A46	N.C.	B12 ▷	···· BLUE1(5)	B29	GND
A13	GND	A30 ▷	···· RED2(5)	A47	N.C.	B13	GND	B30 ▷	···· RED3(5)
A14 ▷	···· BLUE2(5)	A31	GND	A48	GND	B14 ▷	···· BLUE3(5)	B31	GND
A15	GND	A32 ▷	···· RED4(5)	A49 ◁	···· RXD(5)	B15	GND	B32 ▷	···· RED5(5)
A16 ▷	···· BLUE4(5)	A33	GND	A50	GND	B16 ▷	···· BLUE5(5)	B33	GND
A17	GND	A34 ▷	···· RED6(5)			B17	GND	B34 ▷	···· RED7(5)



Main Control Board(CN311) ⟷ Operation Panel(CN2)

CN311 CN1 Pin No.	Pin No.	Signal	CN311 CN1 Pin No.	Pin No.	Signal	CN311 CN1 Pin No.	Pin No.	Signal	CN311 CN1 Pin No.	Pin No.	Signal
A1	A1	X_ANALOG(0~5)	A18	A18	XCK(5)	B1	B1	GND	B18	B18	GND
A2	A2	Y_ANALOG(0~5)	A19	A19	LD0(5)	B2	B2	GND	B19	B19	GND
A3	A3	X_BIAS(0~5)	A20	A20	CONTRUST(0~5)	B3	B3	GND	B20	B20	GND
A4	A4	Y_BIAS(0~5)	A21	A21	LD1(5)	B4	B4	GND	B21	B21	GND
A5	A5	GND	A22	A22	LCD5V	B5	B5	GND	B22	B22	GND
A6	A6	GND	A23	A23	LCD5V	B6	B6	GND	B23	B23	GND
A7	A7	GND	A24	A24	LD2(5)	B7	B7	GND	B24	B24	GND
A8	A8	GND	A25	A25	DISP	B8	B8	GND	B25	B25	GND
A9	A9	GND	A26	A26	LD3(5)	B9	B9	GND	B26	B26	GND
A10	A10	GND	A27	A27	UD3(5)	B10	B10	GND	B27	B27	GND
A11	A11	GND	A28	A28	UD4(5)	B11	B11	GND	B28	B28	GND
A12	A12	LD4(5)	A29	A29	UD2(5)	B12	B12	GND	B29	B29	GND
A13	A13	LD5(5)	A30	A30	UD5(5)	B13	B13	GND	B30	B30	GND
A14	A14	YD(5)	A31	A31	UD1(5)	B14	B14	GND	B31	B31	GND
A15	A15	LD6(5)	A32	A32	UD0(5)	B15	B15	GND	B32	B32	GND
A16	A16	LP(5)	A33	A33	UD6(5)	B16	B16	GND	B33	B33	GND
A17	A17	LD7(5)	A34	A34	UD7(5)	B17	B17	GND	B34	B34	GND

Test Point:Main Control Board

Signal	TP No.	Signal	TP No.	Signal	TP No.	Signal
GND	TP122	/LFGATE	TP145	/INT G1	TP167	FB BDC
GND	TP123	LCLK	TP148	CLK	TP168	HUM
X-	TP124	/DME	TP153	/AS	TP170	/Z CROSS
X+	TP130	GND	TP154	UPHT TH	TP172	TMP
Y-	TP131	/RESET	TP155	/IACK	TP173	P SEN2
Y+	TP134	/FGATE	TP156	LWHT TH	TP174	P SEN1
+5V	TP137	BLTPTN	TP157	FB T2	TP176	V SEN
XCK	TP138	/DSACK1	TP158	FB T1	TP178	ENGY
LP	TP141	/DSACK0	TP160	FB G	TP182	ANGND
YD	TP142	/INT G3	TP162	FB C	TP185	GND
/VRAM	TP143	GND	TP165	/REV HP	TP186	+5V
LLSYNC	TP144	/INT G2	TP166	/SERR	TP187	GND

Main Control Board(CN305) ⟷ Bus S/W Board(CN102)

CN305 Pin No.	CN102 Pin No.	Signal	CN305 Pin No.	CN102 Pin No.	Signal
A1	A12	P3CLK(5)	B1	B12	RXD8(5)
A2	A11	/P3ST(5)	B2	B11	GND
A3	A10	P3AD7(5)	B3	B10	RXD7(5)
A4	A9	P3AD5(5)	B4	B9	GND
A5	A8	P3AD3(5)	B5	B8	GND
A6	A7	P3AD1(5)	B6	B7	/RESET(5)
A7	A6	GND	B7	B6	P3AD0(5)
A8	A5	*RTRG(▼5)	B8	B5	P3AD2(5)
A9	A4	WKUP(▲5)	B9	B4	P3AD4(5)
A10	A3	TXD7(5)	B10	B3	P3AD6(5)
A11	A2	GND	B11	B2	GND
A12	A1	TXD8(5)	B12	B1	GND

LD Main Control Board(CN605) ⟷ LD Drive Board(CN1)

CN605 CN1 Pin No.	Pin No.	Signal	CN605 CN1 Pin No.	Pin No.	Signal	CN605 CN1 Pin No.	Pin No.	Signal
1	30	LGND	21	10	LDLVL(▲5)	21	10	LGND
2	29	VCC2LD(5)	22	9	R400(▼5)	22	9	XWD7(▼5)
3	28	LGND	23	8	LGND	23	8	XWD6(▼5)
4	27	VCC2LD(5)	24	7	X2TSMOD(▼5)	24	7	XWD5(▼5)
5	26	LGND	25	6	LDON(▼5)	25	6	XWD4(▼5)
6	25	VCC2LD(5)	26	5	LDOFF(▼5)	26	5	XWD3(▼5)
7	24	LGND	27	4	LGND	27	4	XWD2(▼5)
8	23	VCC2LD(5)	28	3	LDCLK(▲5)	28	3	XWD1(▼5)
9	22	LGND	29	2	LGND	29	2	XWD0(▼5)
10	21	XLDERR(▼5)	30	1	PD(▼5)	30	1	LGND

LD Main Control Board(CN609) ⟷ Bus S/W Board

CN609 Pin No.	Signal	CN609 Pin No.	Signal	CN609 Pin No.	Signal	CN609 Pin No.	Signal	CN609 Pin No.	Signal	CN609 Pin No.	Signal
A1	GND	A18	GND	A35	XPDATA9(5)	B1	GND	B18	GND	B35	XSDATA0(5)
A2	GND	A19	XPDATA2(5)	A36	GND	B2	GND	B19	GND	B36	GND
A3	XSIFGATE(▼5)	A20	GND	A37	XPDATA10(5)	B3	XSDATA15(5)	B20	GND	B37	XOPMSYNC(▼5)
A4	GND	A21	XPDATA3(5)	A38	GND	B4	GND	B21	XSDATA7(5)	B38	GND
A5	XSILSYNC(▼5)	A22	GND	A39	XPDATA11(5)	B5	XSDATA14(5)	B22	GND	B39	XIMFGATE(▼5)
A6	GND	A23	XPADAT4(5)	A40	GND	B6	GND	B23	XSDATA6(5)	B40	GND
A7	XSICLK(5)	A24	GND	A41	XPDATA12(5)	B7	XSDATA13(5)	B24	GND	B41	GND
A8	GND	A25	XPDATA5(5)	A42	GND	B8	GND	B25	XSDATA5(5)	B42	GND
A9	GND	A26	GND	A43	XPDATA13(5)	B9	XSDATA12(5)	B26	GND	B43	XSOCLK(5)
A10	GND	A27	XPDATA6(5)	A44	GND	B10	GND	B27	XSDATA4(5)	B44	GND
A11	XOMFGATE(▼5)	A28	GND	A45	XPDATA14(5)	B11	XSDATA11(5)	B28	GND	B45	XSOLSYNC(▼5)
A12	GND	A29	XPDATA7(5)	A46	GND	B12	GND	B29	XSDATA3(5)	B46	GND
A13	XOPMSYNC(▼5)	A30	GND	A47	XPDATA15(5)	B13	XSDATA10(5)	B30	GND	B47	XSOFGATE(▼5)
A14	GND	A31	GND	A48	GND	B14	GND	B31	XSDATA2(5)	B48	GND
A15	XPDATA0(5)	A32	GND	A49	GND	B15	XSDATA9(5)	B32	GND	B49	GND
A16	GND	A33	XPDATA8(5)	A50	GND	B16	GND	B33	XSDATA1(5)	B50	GND
A17	XPDATA1(5)	A34	GND			B17	XSDATA8(5)	B34	GND		

LD Main Control Board(CN607) ⟷ LD Main Control Board(CN608)

CN607 CN608 Pin No.	Pin No.	Signal	CN607 CN608 Pin No.	Pin No.	Signal	CN607 CN608 Pin No.	Pin No.	Signal	CN607 CN608 Pin No.	Pin No.	Signal	CN607 CN608 Pin No.	Pin No.	Signal	CN607 CN608 Pin No.	Pin No.	Signal
1	50	GND	10	41	GND	19	32	/SDATA2(5)	28	23	GND	37	14	/SDATA10(5)	46	5	GND
2	49	GND	11	40	/IMFGATE(▼5)	20	31	GND	29	22	/SDATA7(5)	38	13	GND	47	4	/SDATA15(5)
3	48	/SOFGATE(▼5)	12	39	GND	21	30	/SDATA3(5)	30	21	GND	39	12	/SDATA11(5)	48	3	GND
4	47	GND	13	38	/IPMSYNC(▼5)	22	29	GND	31	20	GND	40	11	GND	49	2	GND
5	46	/SOLSYNC(▼5)	14	37	GND	23	28	/SDATA4(5)	32	19	GND	41	10	/SDATA12(5)	50	1	GND
6	45	GND	15	36	/SDATA0(5)	24	27	GND	33	18	/SDATA8(5)	42	9	GND			
7	44	/SOCLK(▼5)	16	35	GND	25	26	/SDATA5(5)	34	17	GND	43	8	/SDATA13(5)			
8	43	GND	17	34	/SDATA1(5)	26	25	GND	35	16	/SDATA9(5)	44	7	GND			
9	42	GND	18	33	GND	27	24	/SDATA6(5)	36	15	GND	45	6	/SDATA14(5)			

Test Point:I/O Control Board

TP No.	Signal	TP No.	Signal	TP No.	Signal	TP No.	Signal	TP No.	Signal
TP201	RP_SEN2	TP221	FB_T1	TP267	VAA2	TP267	XRA_PRT	TP289	XFUS_TRG
TP202	RP_SEN2	TP222	HUM_SEN	TP268	VCA	TP268	XTRG_D	TP290	XFDOPEN
TP203	T2_SEN	TP223	TMP_SEN	TP269	VCB	TP269	RM_I08A	TP291	XFEEDOPEN
TP204	XFEED_PE	TP224	FB_C	TP270	CGNDA	TP270	RM_I15A	TP292	XEXITOPEN
TP205	XIMD_SEN	TP225	V_SEN	TP271	CGND	TP271	XIMP_TRG	TP293	XLEAK_D
TP206	FUD_SEN	TP226	FB_G	TP272	XEXIT_SEN	TP272	XTRG_PCC	TP294	XLEAK_PCC
TP207	IMP_CLK	TP227	P_SEN1	TP273	XFUS_FAN	TP273	XTRG_BAC	TP295	XIMP_LOCK
TP208	PWM_T2	TP228	FB_BDC	TP274	XZ_CROSS	TP274	FUMTR-	TP296	XBPFSIZE0
TP209	PWM_T1	TP229	P_SEN2	TP275	ENGY_ON	TP275	XTRP_FAN	TP297	XFEED_LOCK
TP210	BLTPTN	TP230	LWHT_TH	TP278	PLED	TP278	XRGT_CL	TP301	XBPFSIZE3
TP211	XREV_HP	TP231	UPHT_TH	TP279	BC_SEN	TP279	XMID_CL	TP302	XBPFSIZE2
TP212	XRGT_SEN	TP232	CGNDA	TP280	XDEV_CL	TP280	XEXU_FAN	TP303	XBPFSIZE1
TP213	AGND	TP233	CGND	TP281	XDUP_SOL	TP281	FUMTR+	TP306	XOILEND
TP214	RM_A	TP234	PWM_BDC	TP282	XT_CNT2	TP282	XSWP_CL	TP308	XFUS_LOCK
TP215	FEED_CLK	TP235	FUS_CLK	TP283	XKCOUNT	TP283	XFUS_CL	TP309	XRA_SCN
TP216	XIORST	TP236	PWM_C	TP284	XBPF_CL	TP284	XBC_CL	TP310	XLWHT_TRG
TP217	IOCLK	TP237	PWM_G	TP285	XCH_FAN	TP285	XFEED_CL	TP311	XUPHT_TRG
TP218	XST	TP239	VCC2A	TP286	XQL	TP286	XT2_CL	TP312	XBPF_SOL
TP219	DIR	TP240	VCC2	TP287	XT_CNT1	TP287	XIMP_CW	TP313	XEXU_FAN2
TP220	FB_T2	TP241	AGND	TP288	XT_MTR	TP288	XFEED_TRG		

Test Point:LD Main Control Board

TP No.	Signal	TP No.	Signal
TP601	GND	TP607	XPM
TP602	LDON	TP608	XWFG
TP603	XWD7	TP609	XBFG
TP604	LDCLK	TP610	GND
TP605	LDLVL	TP611	XSLS
TP606	BTRIG	TP612	XSFG